THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

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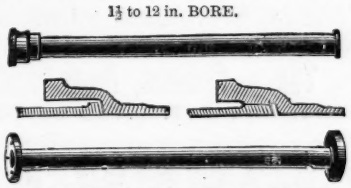

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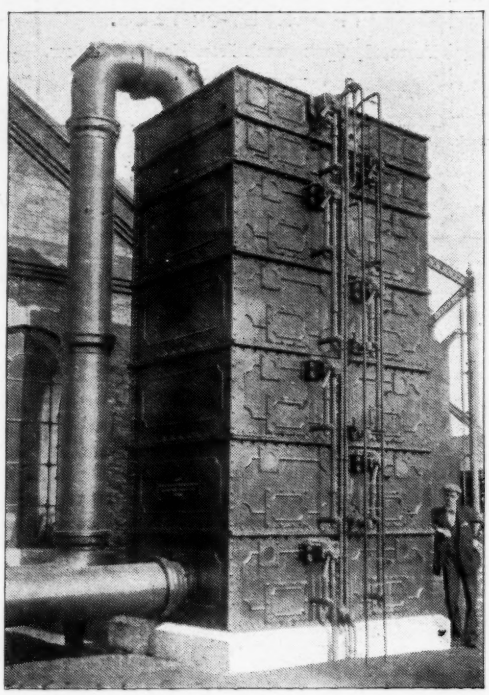

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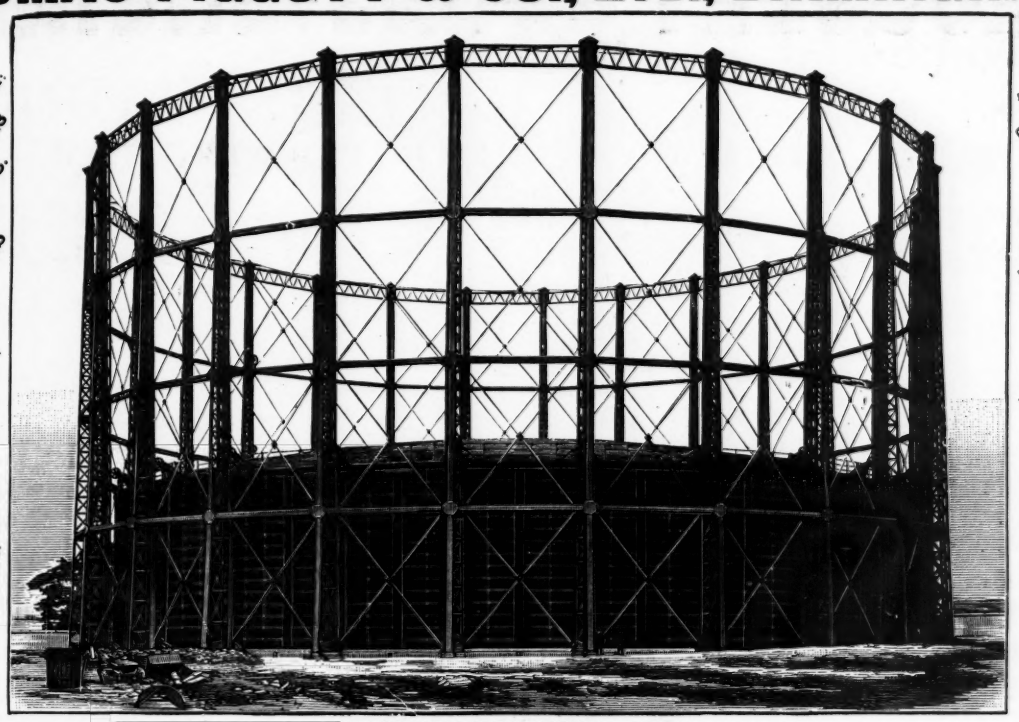

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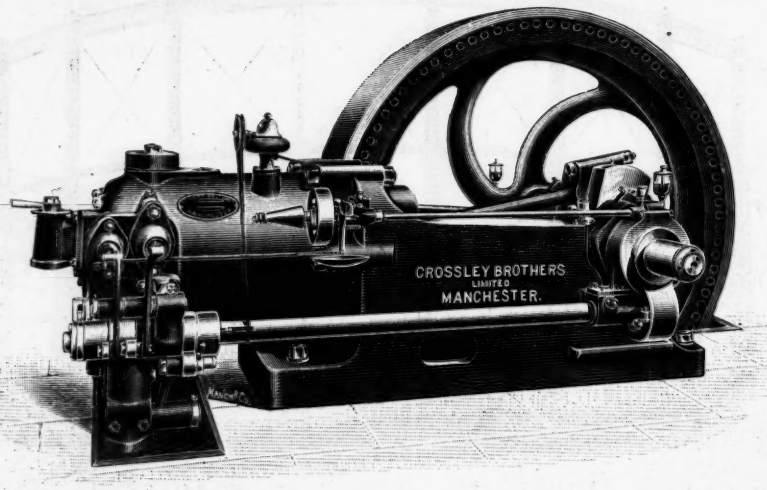

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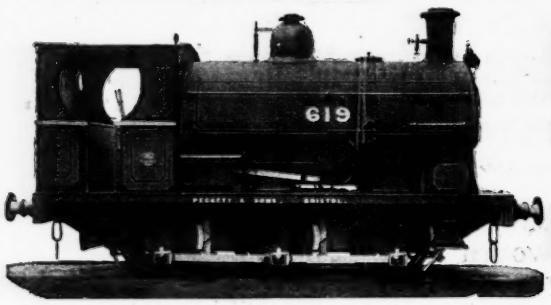

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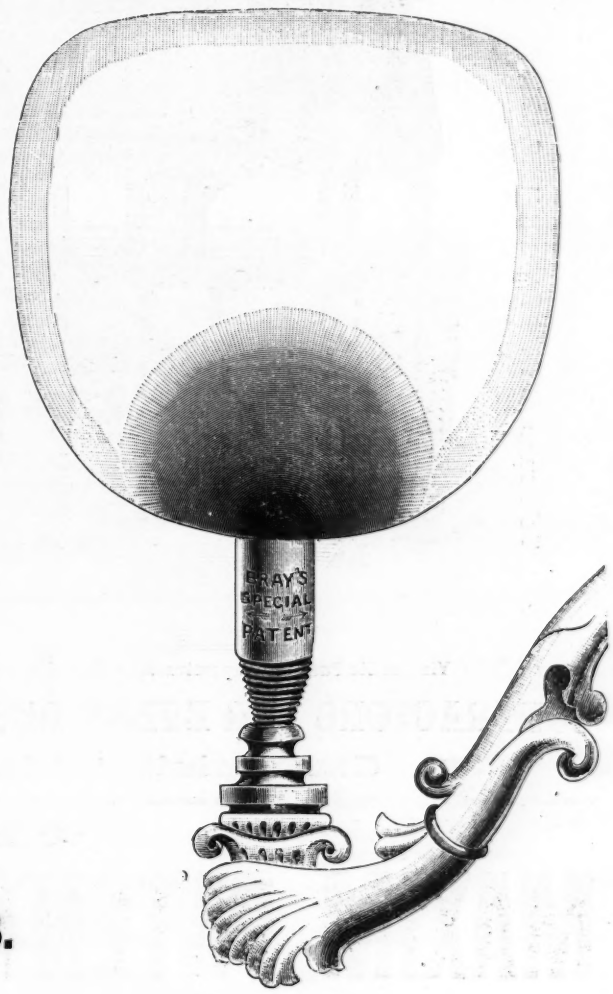

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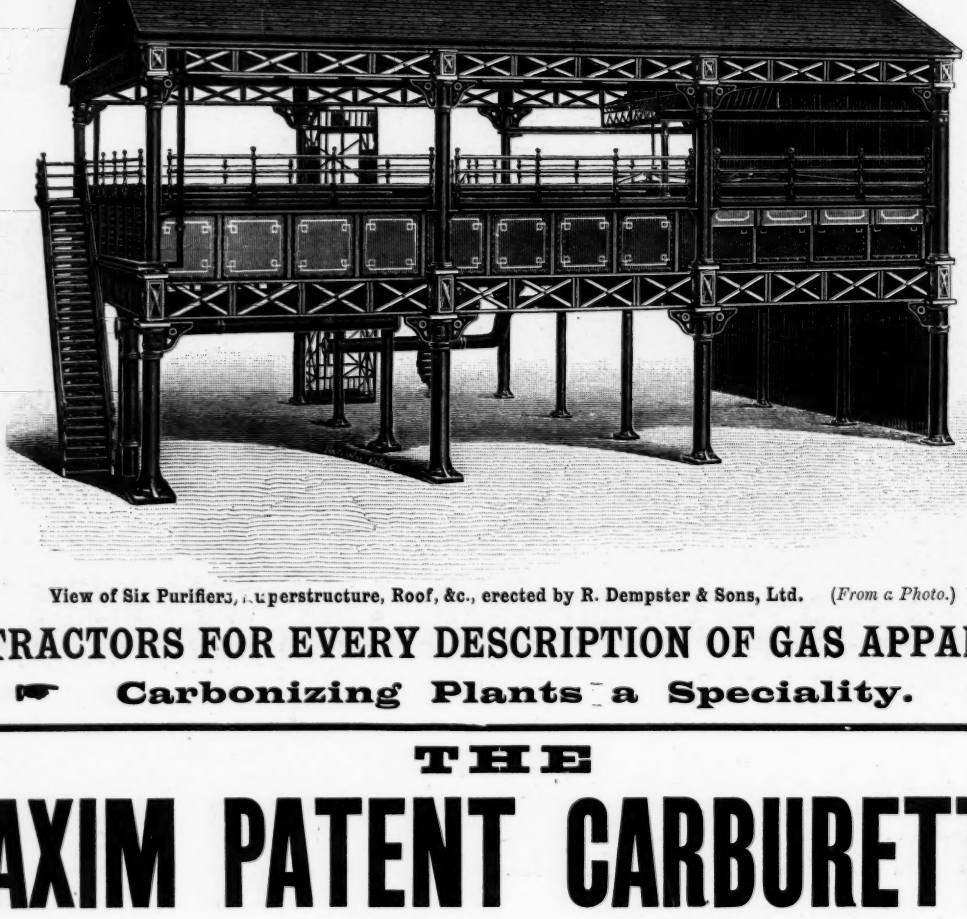

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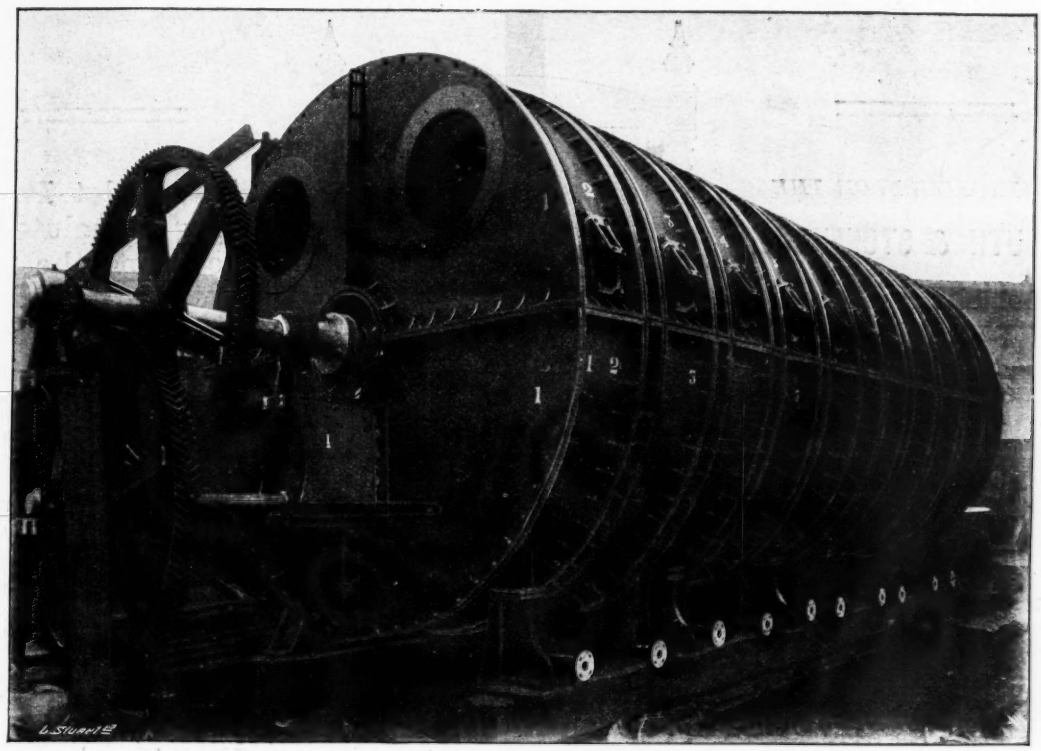

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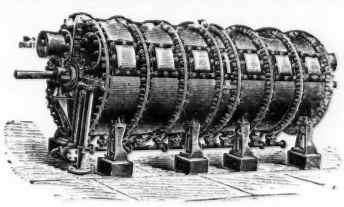

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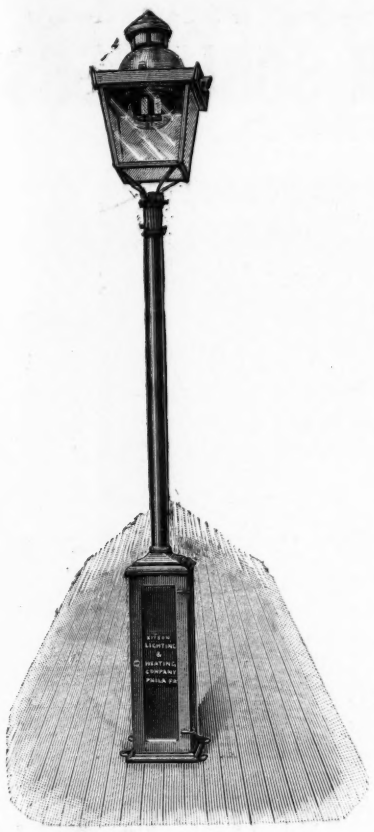

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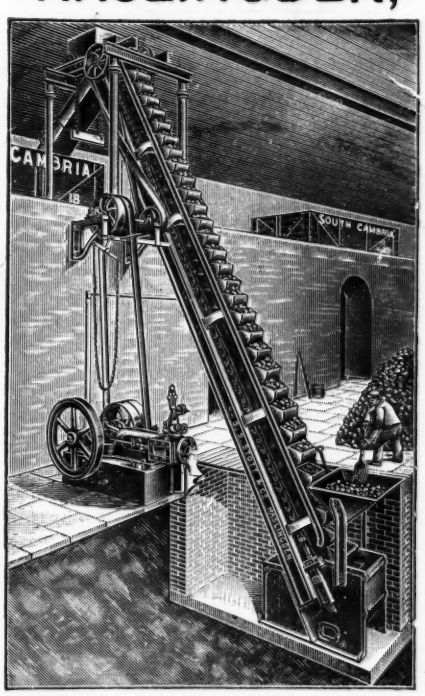

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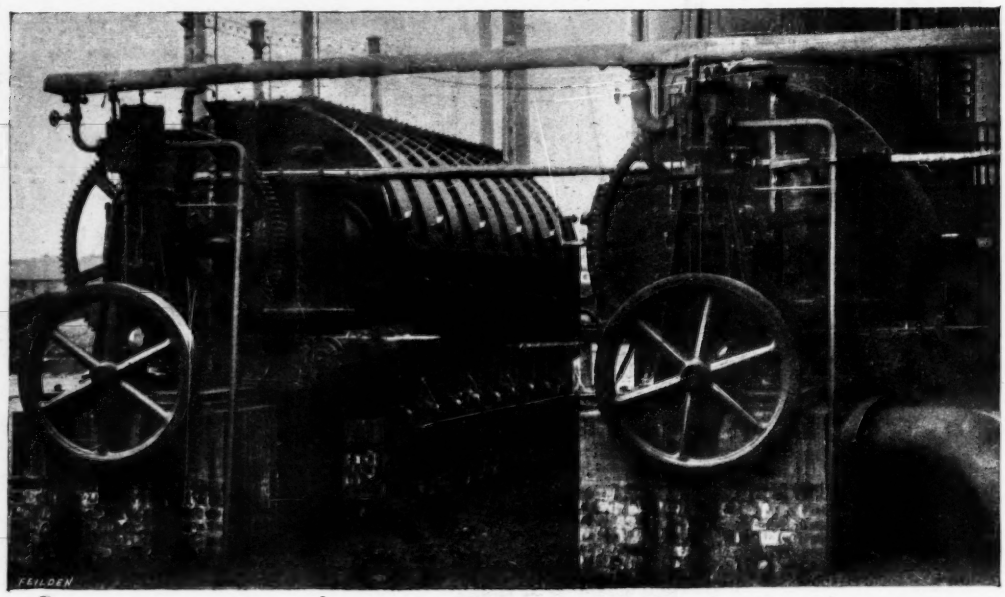

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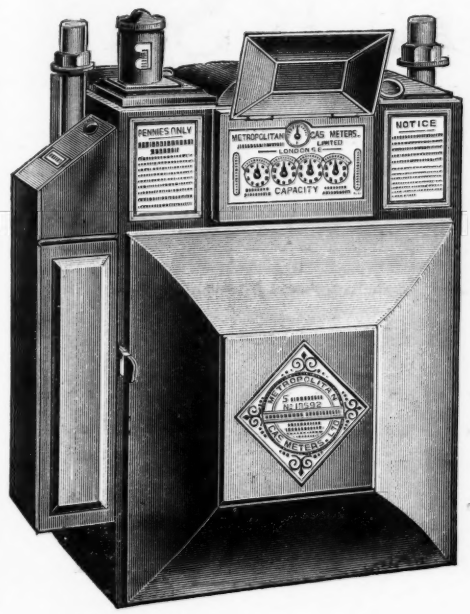

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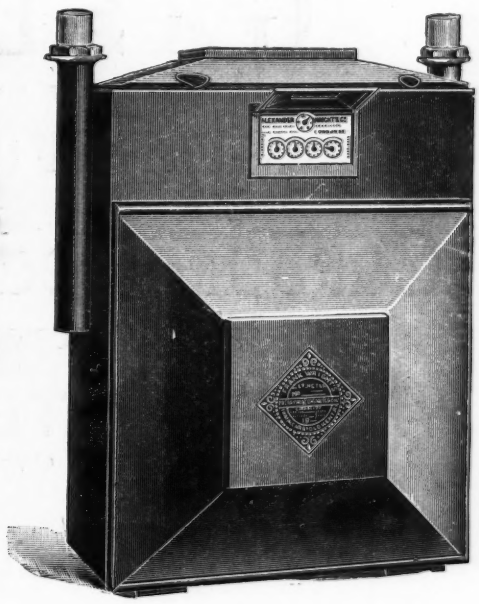

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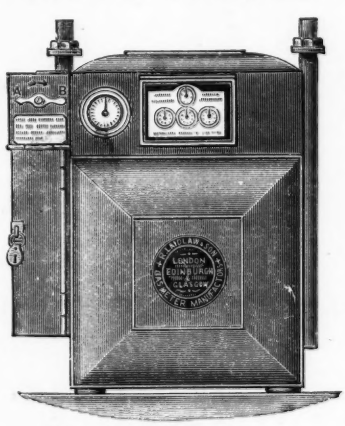

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CONTENTS.

EDITORIAL NOTES:—
GAS, LIGHTING, &c.—
The South Metropolitan Meetings . . 451
Gas-Works and their Supplies 451
The London County Council and the Gas Bills 452
The Decline in Trade and Coal Prices . 453
The King's Speech 453
WATER AFFAIRS—
The Future of the London Water Supply 453
The Proposed New Water Regulations . 454
ESSAYS AND REVIEWS:—
High-Pressure Gas Distribution . . . 455
Electric Lighting Memoranda 455
The Gas and Water Stock Market . . 456
A Handbook to London Government. . 456
Water Bills for 1901 457
NOTES:—
Another Fireproof Flooring 458
Swedish Peat as a Coal Substitute . . 458
Vibration of the Ground through Gas-Engines 458
Non-Electrolytic Traction Systems . . 458
COMMUNICATED ARTICLE:—
Business Sketches in America: Some Methods Worth Emulating. By E. W. T. Richmond 459
TECHNICAL RECORD:—
Future of the London Water Supply . . 462
REGISTER OF PATENTS:—
Gas-Engine Governor—Rowden, W. T. . 464
Gas-Generator—Leroy, P. 464
Lighting Street-Lamps—Taig, J. B., T., & R., and Robertson, J. 465
Gas-Burners—Bray, G. 465
Devices for Causing the Ignition of Illuminating Gases—Thompson, W. P. (Simonini, A.) 465
Air-Cooler for Gas-Engine Cylinders—Rea, S. W. 465
Incandescent Gas-Lamps—Dymond, G. C. (Zielenziger, S.) 466
Igniting Gas—Deimel, F. 466
Gas-Burner Regulators—Bablon, I. N. V. 466
Incandescent Burners—Scheele, T. A. . 466
Incandescent Burners—Carpenter, C. C. 466
Igniting Incandescent Gas-Burners—Carpenter, C. C. 467

REGISTER OF PATENTS (*continued*)—
Incandescent Gas-Burners—Thompson, W. P. (Jolles, B., and Zietz and Bruno) 467
Patent Notices 467
CORRESPONDENCE:—
The London Chamber of Commerce and the Electrolysis of Gas and Water Pipes 468
LEGAL INTELLIGENCE:—
Damage to Mains by a Traction-Engine. 468
Thefts from Prepayment Meters . . . 468
MISCELLANEOUS NEWS:—
Meetings of the South Metropolitan Gas Company 469
Meeting of the Crystal Palace District Gas Company 471
Sheffield United Gas Company . . . 473
Croydon Commercial Gas Company . . 473
Tottenham and Edmonton Gas Company 473
Meeting of the Bromley Gas Consumers' Company 473
Provincial Gas and Water Companies . 474
Devonport Gas-Works Purchase Scheme—Meeting of the Ratepayers . . . 476
Gravesend Town Council and the Gas Company—Opposition to the Company's Bill 477
Leigh Corporation and the Golborne Gas Supply—Charge for Gas in the Out-Districts; Opposition to the Golborne Gas Bill 477
Proposed Extension of the St. Mary Church Gas-Works 477
Walsall Corporation Gas Supply—The Past Year's Work 478
Proposed Reconstruction of the Rio de Janeiro Gas Company. 478
Electric Lighting Notes 478
Newtown and Llanwchaiarn Gas Arbitration 479
Work of the Liberty and Property Defence League 483
Metropolitan Water Companies' Regulations—Local Government Board Inquiry 483
Gas and Water Companies' Stock and Share List 485
Notes from Scotland 486
Current Sales of Gas Products. . . . 488
Coal Trade Reports 488

PARAGRAPHS:—
Personal 457
Obituary 458
Messrs. George Glover and Company, Limited—Anti-Vibrators 454
Lighting and Illumination—The Boiling Point of Liquid Hydrogen—Automatic Electric Cut-Off 458
Midland Association of Gas Managers . 464
Louth Corporation and the Water-Works 467
Oxide and Lime in Gas Purification . . 468
Riparian Owners' Rights 476
Shepton Mallet Gas—Divining for Water 479
The New Water-Works for Barnsley—Chard Water Supply—Extra Payments to Salaried Officials—West Gloucester Water Company's Extensions . . . 483
London County Council and Proposed Gas Legislation—Sheffield Master Plumbers and the Water Committee—Soft Water and Defective Bone Formation—Gibraltar Water Supply—Wells Water Supply—Newport Gas Workers Invited to Become Stockholders . . 489
Incandescent Gas Lighting for Theatres—Gas *v.* Electricity at Salisbury—Water Gas Manufacture at Pettau—Driffield Gas-Works Extension—A Loyal but Unenlightened District—Checking Waste of Water in Salisbury—Rescue of Victims of Trolley-Wire Accidents . . 490
Opposition to the Stroud Gas Bill—Mr. W. M'Crae on the Dundee Gas Supply—Lighting of Ballymena—Omagh Gas Bill—Mond Bill Opposition—Carlisle Gas-Workers—Shrewsbury Gas Bill—Galgate Water Supply—Aldershot Gas and Water Bill—Portable Photometer in South London 491
Broadstairs and the Water-Works—Colwyn Bay and the Gas-Works—Ilkeston and Heanor Water—Serious Gas Explosions—York Town Gas-Works—Suffocation by Gas at Brighton . . . 492
Margate Water—Public Lighting of Woking—Artesian Boring at Hampstead—Water for Fire Extinction—The Lighting of Montreal—Dover Water Supply . 493

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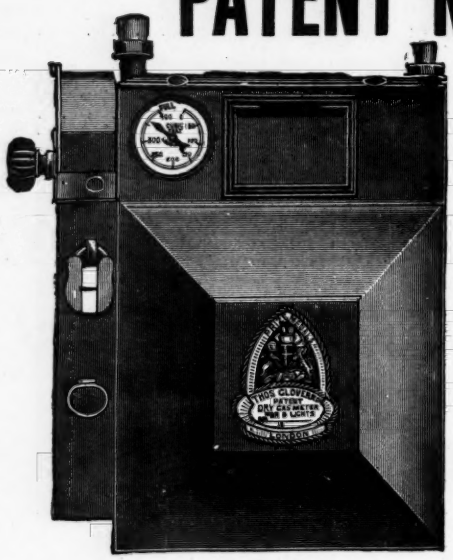

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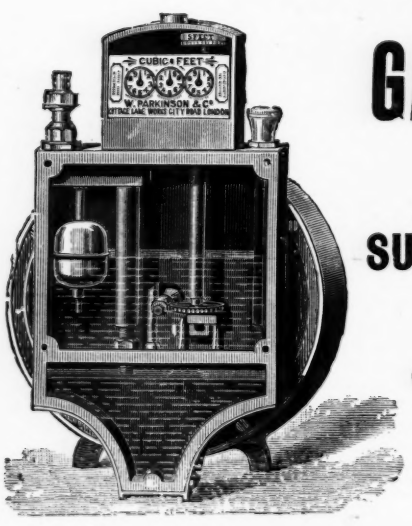

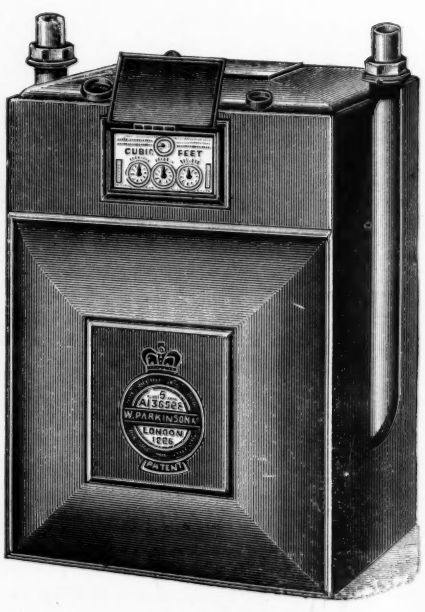

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JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

VOL. LXXVII., No. 1971.——TUESDAY, FEBRUARY 19, 1901.

EDITORIAL NOTES.

The South Metropolitan Meetings.

THE South Metropolitan meetings were held in the Great Hall of Cannon Street Hotel on Wednesday last; and a full report of the somewhat lengthy proceedings appears in another part of the "JOURNAL." Mr. George Livesey, Chairman of the Company, presided; and the harmony of the occasion was perfect. Mr. Livesey's addresses at these half-yearly meetings are usually of the nature of semi-popular lectures on the actualities of the undertaking, and on current events influencing more or less the condition and prospects of the gas industry at large and the South Metropolitan concern in particular. The reason for this peculiar cast of the Chairman's official remarks lies in the unique character of his regular auditory. The South Metropolitan meetings are largely constituted of people who are interested to hear all about gas. They are interested financially also, of course, as proprietors of the undertaking. But they appear to desire to hear of something more than their dividends. If Mr. Livesey did not gratify this praiseworthy curiosity, he would be asked questions. Like all good public speakers, he possesses the gift of sympathetic correspondence with his audience, and feels when they are interested in what he is saying. Consequently, those who like to hear a thoroughly good speech all about gas, in most of its aspects and bearings, can depend upon getting this satisfaction out of the South Metropolitan Chairman when he is delivering his official soul at the regular half-yearly meetings. And truth to state, the number is large, and seems to increase every time.

The first important topic broached by Mr. Livesey on the present occasion was the course of the year's coal prices, and the result of the experiment of halving the usual contract period which was adopted last spring, for reasons stated at the time. Shortly, the experiment was unsuccessful in attaining its immediate object; the second set of coal purchases for the year having to be made at the same figures as the first. Yet, in Mr. Livesey's judgment, the consequential effects of the venture were good, and such as to justify it. It is surprising to learn that some of the Company's coal contractors took umbrage at the proposal to buy short, on account of the high price of coal at the period—arguing that they had a right to profit, as fully as the custom of yearly contracts permitted, from the favourable conditions of the moment. That is nonsense. As well might a retail tradesman complain of regular customers for buying less than usual of commodities that happen to be dear. Of course, Mr. Livesey defended the sliding-scale once again, which is, perhaps, the one topic he is apt to overlay with one-sided argument. After all is said, the chief end of all such arrangements is to get the undertaking down to its lowest economic bearings. In the South Metropolitan case, this is confessedly the actual state of affairs; for the dividend stands at 5 per cent., where the Chairman says it is likely to remain. There is thus a block on the slide, for the present.

The coal market having fallen to pieces—a condition unhappily anticipated by coke—South Metropolitan gas is certainly going to be 2d. cheaper in the summer. Possibly the reduction will be even greater. Then the Chairman explained fully the steps initiated by the Company for facilitating the street lighting of the district on the Welsbach incandescent system. Here is disclosed one of the secrets of the Company's success—they are not afraid to take the initiative. Of how many gas companies can this be said? Unfortunately, as all the world knows, most of them cannot be induced to move at all by anything less than an explosion of moral dynamite. Proceeding to the curious and unique Rotherhithe meter incident, the Chairman took the opportunity for explaining that the Company only ask for the fair treatment in this regard which they are in the habit of extending to all their customers. Then came the inevitable reference to the profit-sharing system; and the Chairman's address ended with quite a formal peroration concerning gas matters in general.

Mr. J. Mews, a Director, made a neat little point of the stability of the Company's stock in comparison with other "gilt-edged" securities; and Mr. Austin, one of the Workmen-Directors, drew attention to the vast difference between the amounts of money per head of the membership accumulated by the Gas Workers' Union, and that standing to the credit of the profit-sharing workmen in the Company's service. In explaining the proposals of the Company's Bill, the Chairman laid most stress upon the suggestion for regularizing their established practice of issuing new stock at a fixed price. In connection with this proposal, it is pertinent to recall the confession of the Governor of the Gaslight and Coke Company, at the recent meeting, that the statutory obligation to communicate to the Secretary of the Stock Exchange the intention of the Company to offer fresh stock for sale by tender invariably depresses the market. This is the fact, whatever may have been the intention of Parliament in requiring the Stock Exchange to be notified. It is not to be supposed that Parliament meant to put the Gas Companies at the mercy of the stock speculators; but this is what has happened. Mr. Livesey, as is well known, revolted years ago against this abuse of the statutory enactment. Perhaps by this time even Colonel Makins is converted from the rigid faith he once professed in strict adherence to the letter of the law on this head, in scorn of consequence. Be this as it may, there has been no hanging-up of South Metropolitan stock, thanks to the boldness of the Board in acting in agreement with the spirit, and not by the much-abused letter, of their Acts. Their policy has been since adopted by the Government, and also by the London County Council—which circumstance, naturally, does not hinder the latter body from professing to see grave objections to this part of the South Metropolitan Bill, which they mean to oppose with might and main. Surely, the County Council must be all lawyers, habituated to argue by their briefs.

Gas-Works and their Supplies.

THE Crystal Palace District Gas Company's meeting, reported in another column, was made the occasion of a suggestion by the Chairman (Mr. George Livesey), which has a familiar look for humble students of the paramount leader of the gas engineering profession in his more erratic, as well as in his soberest, moods. Like the British Workman, Mr. Livesey can be easily stirred to vigorous protest, and even to violent action, by receiving the impression that he is being "put upon." He has already given abundant proofs of his sensitiveness in this respect; having built steam-tugs, and dumb barges, and station-meter drums, and concrete gas-tanks, rather than submit tamely to what he considered the extortionate demands of the recognized purveyors of such things. There are those who say that the Gas Workers' Union might have ridden him for a good while longer on the snaffle; but the swelled-headed officials of that organization rashly tried the curb, with the historic result. Be this as it may, Mr. Livesey last year stood up to the coalowners, and tried which was the stronger. It is true they beat him on the year's deals, which he chose to do by halves; but he "took it fighting." Now he expects to have his turn again; but he will not let the coalowners off with their past year's gains without giving them a bit of his mind. In popular speech, he thinks they "pulled the string too "hard," and have made the trade of the country suffer unduly. When their Nemesis appears, she will be discovered leaning on the arm of Mr. George Livesey. But it is not only the colliery proprietors who may look forward with dread to this terrible appearance. If the manufacturers and suppliers of various gas-works necessaries do not look to their manners, they may be confronted with a vast co-operative organization for doing that which the larger gas undertakings are already able to do at will—purvey at cut-prices all such commodities as gas companies need. Mr. H. E. Jones gave the suggestion his blessing; and it is incontestable that the gas companies of the United Kingdom could do far more for themselves in this sense than has hitherto been deemed either necessary or expedient.

The European Gas Companies are usually self-supplying with all small goods. No gas undertaking known to us

owns a coal mine, or an oil well, or even manufactures its own large fire-clay goods. The obstacles in the way of such developments have been as much geographical as economical. Yet the economic objections to such large departures from the proper business of gas making are solid. No well-directed company would dream of buying coal or iron or fire-clay property on the top of the market; and when it might be financially possible to carry out such an operation, it would not be commercially worth while. Probably every gas company, railway company, and steamship line in the world have bought far more supplies in the open market at unremunerative or barely remunerative prices to the merchants than they have at highly profitable rates. It should be remembered that every natural influence in trade tends to make the ruling price of any commodity that at which the most favourably situated producer can put it upon the market. All these front stalls are occupied.

Local and temporary circumstances may play into the hands of one set of traders, and enable them to take a bigger bite than usual out of the others; but the level of commerce is not disturbed for long by these incidental irregularities. Dealers may agree upon an advance of prices for wares of a particular class; and it is hard to see why the price of meters or stoves should not be adjusted to any increased manufacturing costs, as the price of gas is to that of coal. But the people who deal in these goods are not asleep. They feel the pulse of trade; and there is not one of them who would trust his Brother Chip not to make a bold bid for larger custom by cutting prices betimes. Of course, there are foolish persons in all trades, who will run the risk of outstanding their market; but there are not more of them in the ancillary branches of the gas industry of the United Kingdom than in other businesses.

The London County Council and the Gas Bills.

THE report of the Parliamentary Committee of the London County Council on the two Metropolitan Gas Bills of the present session was summarized in last week's "JOURNAL." It duly came before the Council at the meeting on Tuesday, and was adopted unanimously. These Bills will therefore be opposed with all the vigour and ability which the Council are able to display in this order of municipal emprise. Comment has been made in another paragraph on the unfavourable view taken by the Parliamentary Committee of the proposal of the South Metropolitan Bill to substitute a system of issuing new stock at a fixed price for the existing statutory sale by auction or tender. This is really the only matter of fresh or intrinsic interest in the Bill, which otherwise merely proposes to empower the Company to co-operate with the Gaslight and Coke Company, in order to carry out the recommendation of Sir James Rankin's Committee that the old southern district of the London Company should be transferred to the South Metropolitan undertaking; and asks for another million of capital powers, presumably as compensation for the trouble and expense of this application to Parliament. The London County Council appear to be profoundly distrustful of the asserted motives which caused the South Metropolitan Company to promote another Bill this year. The transfer proposal is opposed, it is true, not because it would do this Company any specific good. Such a result is nowhere recognized as probable, or even possible. The only assigned reason for resisting the execution of this recommendation of the Powers of Charge Committee is that, as the matter stands, any capital sum paid by the one Company to the other would serve the recipient as ordinary additional capital, and so help them to keep out of Parliament; while the severance of the southern area from the remainder of the Gaslight and Coke Company's undertaking would relieve the Company of the obligation to charge no more than the South Metropolitan price for public lighting everywhere. With regard to the request of the South Metropolitan Company for a little more money, the Council curtly say that there is no need for it.

In respect of the new stock-issuing scheme of the South Metropolitan Bill, we need only observe, after what has already been said, that the Council do discuss the proposal on its merits. They have the grace to drop all the fustian that was advanced last year about the Company having in contemplation a nefarious plan for creating a close corporation of proprietors, consumers, and workpeople, which, of course, was repugnant to the Socialist soul of the Council. Now the criticism offered is that, whereas the object of the auction clauses is to ensure that the highest possible price is obtained for the stock, it is open to grave doubt whether the proposed alternative method could be relied on, "as against "free public competition," to secure the highest price. To meet this case, it should only be necessary for the promoters of the Bill to convince Parliament that (1) the object of the auction clauses, correctly stated, is not, as a matter of fact, attained; (2) that the free public competition, assumed for the purpose of the second part of the opposition case, is not realized under the statutory arrangement; and (3) that stock issues at a fixed price, under suitable guarantees of *bona fides*, compare favourably, in regard to price obtained, with the older method.

It is when one turns to the Gaslight and Coke Bill that the question of what Parliament will do in the circumstances grows serious; for it does not really matter to the South Metropolitan Company whether their present Bill passes or not. The case of the Gaslight and Coke Company is of a very different character. Everybody who is interested in practical gas politics must have been curious to learn what the competent advisers of the Parliamentary Committee of the County Council would say about this Bill; and now we know. The report of the Committee is given in full in the Council's *agenda* paper dated the 9th inst. The report deals, in the first place, with the way in which the capital proposals of the Bill, if sanctioned, will affect the Company. It shows that, with the addition of the unexhausted capital resources of the Company, and the amount of £900,000 which they may get from their neighbours under conditions already specified, the Act would place the Company in command of £2,700,000, which would keep them out of Parliament for another twelve years. This estimate is not only a sanguine one, but is grossly incorrect. Out of whatever transfer price the Company might secure from the South Metropolitan Company, it would be necessary to provide first for new works in substitution for Nine Elms. This would take one-third of the money, on a modest computation, and might run into more, because all building and engineering work is costly at present, and modern gas-works, though economical in working, are expensive to construct and equip with the best plant and machinery. Again, the Comptroller of the Council did not allow for the circumstance, of which he had no official cognizance, of the whole of the unissued capital stock of the Company being "hung up," as the Governor aptly expressed it. These drawbacks constitute a heavy set-off to the sum with which the Comptroller credits the Company, on his premises. Besides, there is the working capital to be found out of this amount, which the Company are now only able to obtain by borrowing from their bankers at 5 per cent. This is obviously a dear way of getting money, and the consumers have to pay for the whole of it.

With regard to the suggested obsolete stock-redemption fund, the able statisticians of the Council seem to have thoroughly enjoyed themselves in swiftly reducing the merits of the proposal of the Bill to something "infinitesimal." The contribution to the stock-extinction fund would amount to £38,107 a year, which would, at par value, purchase stock to the same figure. The dividend payable on this stock, at £4 3s. per cent., amounts to £1581 a year, which would be available for distribution in the respective proportions of six-sevenths and one-seventh between the consumers and the proprietors. Incidentally, it may be observed that the data taken by the Comptroller and by the Governor of the Company in regard to the capital sum to be wiped out, and the duration of the process at the proposed rate, agree. The Committee condemn the scheme utterly; declaring that "the main question for the consumer is the selling price of gas, "and there is nothing in the Company's Bill which will effect "a reduction of the present excessive charge for gas to a "reasonable figure, or materially assist towards that end."

Thus the issue is clearly joined. The Council repeat the contention that a reduction of the standard price is the only tangible amelioration of the consumers' statutory position possible; and they support this demand on the grounds "that "the cost of the production of gas is much less than it was "when the present standards were fixed, and also because "capital can now be obtained at a much less rate of interest "than formerly." It is scarcely necessary to remark that, inasmuch as the sliding-scale was introduced as a method of obtaining these and every other economic advantage for the consumer, automatically, this declared expediency of revising it implies that it has failed to justify the expectations formed of it. To examine the *pros* and *cons* of this notable proposition would be a bigger job than we can tackle here; and it would be wasted labour, because the integrity of the standard price is already destroyed. It is not a wild supposition

that the sliding-scale itself may some time go the way of the inviolate standard price, which was its very soul; and its parent may yet compose its epitaph.

The Decline in Trade and Coal Prices.

THE speeches of the Chairmen at the meetings of all Gas and Railway Companies contain references to the price of coal in the past year, and to the hope of obtaining more favourable terms in the future. The foundations upon which this hope is based become more firmly established as the weeks pass. Indeed, it is no longer accurate to speak of hope, for it has become changed in the minds of the most pessimistic to what some of us have had for a long time—a feeling of certainty. Mr. Livesey was able to inform the shareholders of the Crystal Palace Gas Company on Friday that he had heard the previous day of a contract having been made at 9s. 6d. per ton f.o.b. Tyne; and that piece of excellent news is confirmed by the trade quotations, which put the Newcastle price at 10s.—a fall of from 6d. to 1s. on the week—and Sunderland gas coal at 9s. 9d. to 10s. 3d. This represents a drop of about 2s. 6d. to 3s. since the beginning of the present year.

Coal for industrial purposes is, in fact, rapidly becoming a drug in the market. Scarcely any casual sales are being effected; contracts alone keeping the collieries from standing idle. The home demand has fallen off; the export trade is languishing; while the output is maintained if not increased. The collieries are therefore not unnaturally getting somewhat fidgety about future contracts, which, equally naturally, customers are in no hurry to place. The waiting policy has been, indeed, completely successful; and negotiation on a reasonable basis should become possible before long. Some of the heavy contracts for locomotive coal run out in six weeks' time; and the Railway Companies concerned will certainly obtain a substantial reduction in price when the new bargains are struck.

The Board of Trade statistics relating to the state of the labour market in January fully confirm the other signs of diminishing trade. The percentage of men unemployed in the works covered by the reports received by the Board was considerably higher in the past month than in January, 1900 (4 as against 2·7 per cent.). In the pig-iron industry, employment shows a further falling off, and is much worse than a year ago. The number of furnaces in blast, which had fallen to 326 at the end of December, declined to 307 at the end of January; the number a year previously being as high as 381. A reduction of 74 furnaces means a decreased consumption of coal per week of nearly 100,000 tons, or 5 millions per annum. In the engineering and iron and steel-making trades the percentage of unemployed continues to compare unfavourably with the corresponding period of last year; while in the tin-plate trade the decline proceeds apace. The mills in operation at the end of January, 1900, numbered 419; at the beginning of this year, 324; at the end of last month, 286—a very striking decrease. Indeed, the tin-plate industry is in an extremely depressed condition, owing largely to the effects of American competition, *plus*, of course, high prices.

The Labour Department report that "for the first time "since November, 1897, the net result of the changes in "wages recorded during the month was a decline, mainly "due to the fall in the iron and steel trades." As, however, the increase of 5 per cent. on 1888 standard rates granted to the Midland coal miners at the beginning of January appears to have been left out of account, we do not think the statement as made is quite accurate. But at any rate the inference to be drawn therefrom—that trade has got on the downhill path—is correct; for the increases granted to miners on the 1st of January and the 1st of February were arranged some months ago, when things looked far more rosy for the coal trade than they do now. It will not be long before the coalowners will be wanting to get back to the lower rates of wages. The coal buyer in the meantime is "on "velvet," in comparison with the position in which he found himself a year ago.

The King's Speech.

FOR the first time for many years it is literally accurate to write of the "Speech" of the Sovereign to Parliament. That which was delivered in the House of Lords on Thursday last by King Edward VII. contained an unusually short list of legislative proposals; and of those which were foreshadowed, few are of direct interest to the gas and water industries. The first paragraph of the Speech to which we may here refer is that relating to the estimates for the year. Every care, it is stated, has been taken to limit their amount; but the naval and military requirements of the country, and especially the outlay consequent on the South African war, have involved an inevitable increase. We mention this paragraph simply in order to express the hope that when the measures by which it is proposed to raise the money required to meet these estimates are laid before the House of Commons, it will be found that the Chancellor of the Exchequer and his colleagues in the Cabinet will have had more regard for the income-tax-paying classes than was displayed in the Budget of 1900. It is high time that some change in the incidence of taxation was made in the direction of weighting political power more obviously with financial liability. The old cry used to be, "No Taxation without "Representation." The need to-day is rather for a wider adoption of the principle of "No Representation without "Taxation."

Another paragraph in the Speech states that certain changes in the constitution of the Court of Final Appeal are rendered necessary in consequence of an increase in the volume of its business during the last two generations. It is to be wished that the Government would take in hand the re-arrangement of all the Courts of Appeal, so as, if possible, to obviate the state of congestion which has become apparently chronic of late years. The legal procedure in this country sadly needs to be put upon a business footing. It is not long since the necessity for the codification of our statute law was pointed out in these columns. Every move in this direction is to be welcomed; and the measure announced by the Government for the consolidation of the Factory and Workshops Acts is—as all who have had to examine the exact bearings of the Workmen's Compensation Act are aware—one that is not being proposed before it is absolutely needed.

Further legislation on the education question is promised. We are much more strongly convinced of the need of educational reform than of the ability of Parliament to effect it. The problem is well stated by a writer in the current number of the "Nineteenth Century" (as we must still call it): "The "child mind is 'educated' chiefly by learning by rote. "Small doses of science are also administered [in our "primary schools]; but the full and careful training of the "observational and creative faculties is still greatly neg-"lected. In secondary schools . . . it is feared that "the tendency of much so-called Technical Education is the "manufacture of mediocrities rather than the expert training "of experts by experts to the highest possible efficiency." Precisely; but these are matters not easily remediable by legislative enactment; and it will be interesting to see the nature of the Government proposals.

Readers of the "JOURNAL" will also await with interest the Bill for amending the Public Health Acts in regard to water supply. Beyond the matters to which we have referred, however, no measure of importance is promised; and it is evident the session that has now opened will not derive its main interest from legislative proposals. So far as our readers are concerned, their attention will be centred upon the Committee Rooms, where much of vital interest and importance may transpire.

WATER AFFAIRS.

The Future of the London Water Supply.

THE protracted discussion on Mr. R. E. Middleton's paper on the above subject, read before the Surveyors' Institution early in December, was brought to a close on Monday last week; and a report of the proceedings will be found elsewhere. Whatever opinion may be entertained as to the suitability of the Institution as the medium for the discussion of such a question as that dealt with in the paper, it must be acknowledged that the facts and figures brought forward by the author, and the criticism they received, will form a valuable addition to the "Transactions." In preparing his paper, Mr. Middleton approached the subject, as his colleague, Mr. Walter Hunter, said in resuming the discussion, in a spirit of scientific inquiry. He carefully avoided all matter of a controversial character; and consequently the debate passed off without any acrimonious remarks. His question was simply this: What are the water requirements of London likely to be in the future, and how are they to be met? And his answer was equally

simple: That the sources of supply within a moderate distance of London are, combined with the Thames, more than sufficient to provide water for any population which may reasonably be expected to be congregated within the Metropolis up to sixty years hence. This was the proposition laid down by Mr. Middleton; and we think it will be acknowledged by all who listened to, or read reports of, the discussion, that it was not controverted. Nor do we see how it well could be, in view of the conclusions of the Balfour and Llandaff Commissions, and of the opinion expressed by the late Sir Edward Frankland in his lecture before the Royal Institution five years ago—that for half-a-century at least we have at our doors "an ample supply of "water which, for palatability, wholesomeness, and general "excellence, will not be surpassed by any supply in the "world."

Several considerations arise out of the paper and the remarks made thereon. Mr. Middleton based his calculation on a supply of 35 gallons per head per day, and accepted the rate of increase of population taken by the Balfour Commission. The question arises as to whether both are not too high. Are 35 gallons of water absolutely needed to satisfy all legitimate requirements? We believe they are not; and we confess to sharing the opinion of those who hold that no one would suffer by a curtailment of the quantity to 30 gallons. Mr. E. K. Burstal, who, it will be admitted, knows something about water supply, goes below this, and says 25 gallons (17 for domestic and 8 for trade purposes) are ample for London or for any well-managed undertaking. A reduction to the first-named figure would bring down by one-seventh the bulk of water required to be provided; while Mr. Burstal's 25 gallons would save enough to supply an additional two million persons, or about 30 per cent. more than the number at present served. The next point is as to the actual population to be supplied. Several causes exist which, it seems to us, justify the conclusion that here, again, the estimate has been put too high. One of these is that last year the birth-rate was very low; and quite recently the average in one week was 260 below the numbers in the corresponding weeks of the past ten years. Though we are far from regarding this fact with equanimity from a national point of view—a stationary or a declining population being a sign of decadence—we think it may be fairly cited as a not unimportant factor in the matter under consideration. In a few months the census will have been again taken; and we shall be surprised if, when the figures are published, they show a continuance of the rate of increase recorded for the preceding decade. Another cause is the possible segregation of the Metropolitan population in the course of the next few years by the gradual removal of factories into the country, and the consequent migration of the hands employed therein to places beyond the area of the present supply. But, in whatever way it may be brought about, if the number of persons to be supplied should fall to any appreciable extent below Mr. Middleton's estimate, and this occurred concurrently with systematic regulation of the supply—regulation which, while allowing the consumer an ample quantity of water for all his reasonable requirements, will put an effectual check on the enormous waste which now goes on—his position, as was pointed out in his reply, would be very materially strengthened.

But assuming that all the water contemplated by Mr. Middleton will be needed in the future, will it be forthcoming from the sources on which he relies? We think he has shown that it will. As far as the Thames is concerned, we know pretty well what its capacity is; and as to the chalk area round London, probably no one is more qualified to speak on the subject than the author of the paper, who specially investigated it for the Balfour Commission. Towards the close of the discussion, Mr. Baldwin-Wiseman adduced some valuable facts to show that the pumping figures taken by the Commission have "a large margin of "safety." The sources at our doors being proved ample, there cannot be any immediate necessity for seeking others at a great distance. We shall not, therefore, discuss the cost or the merits of any scheme which contemplates such an eventuality, especially as this was done fully by Mr. Hunter and other speakers. The question is how the water in our own watershed area, which we are assured will serve us for many years to come, can be the most easily made available for the use of the population. The obvious answer, it seems to us, is by the adoption of some scheme which can be carried out progressively, as necessity arises. We have long held the opinion that the gradual extension of the existing works by the construction of additional reservoirs and pumping-stations near the Thames would solve the problem of the future water supply of London; and when Messrs. Hunter and Fraser laid their Staines scheme before Lord Balfour's Commission, it appeared that this was the initial step in that direction. The first instalment of the scheme is now in progress; and its completion, which may shortly be expected, will place at the service of the Metropolis an additional supply of 35 million gallons of water daily. Of course, as the late Sir Edward Frankland remarked, at the close of the lecture already referred to, "there is nothing heroic in laying pipes along the "banks of the Thames, or even in making reservoirs in the "Thames basin." There is nothing to appeal to the imagination, and little to recommend such a scheme to the mind of the "enterprising engineers" of to-day. But some such pipe-line, or its equivalent, furnishes the solution of one of the present problems connected with the London Water Supply. By the time others arise, there may be in existence an entirely new organization whose special duty it will be to deal with them.

The Proposed New Water Regulations.

It will doubtless be remembered that a substantial portion of the report of Lord Llandaff's Commission was devoted to a discussion of the measures of control of the London Water Companies which it was considered advisable to introduce in the event of the undertakings not being acquired by some public body. This was, in fact, the second of the three subjects with which the Commission were specifically asked to deal; and in connection with this branch of the inquiry they devoted much attention to the question of waste. The Commissioners were shown how the New River Company had effected a very large saving of water by the exercise of strict supervision over its distribution; and they came to the conclusion that the Water Companies might properly be empowered to require that all fittings should be approved and tested by themselves, be renewed or repaired from time to time on their requisition, and be brought into conformity with "regulations properly framed." The Commissioners pointed out that no legislation was necessary for the introduction of the new regulations they recommended; and they expressed the opinion that the Companies had been "remiss "in not proposing a change," as they felt sure the Local Government Board would not withhold their approval of "regulations calculated to prevent a public evil." Stimulated by these observations, the Companies lost no time in framing a set of revised regulations, which have been acknowledged by a competent authority to be more in keeping with those in operation in large provincial towns, and certainly an improvement upon the "emasculated regula-"tions usually finding favour with the Local Government "Board." But no sooner did they submit them to the Board for approval than there was a perfect howl of indignation from all the Metropolitan Local Authorities. The consequence has been that the public inquiry instituted by the Board, under the presidency of the Official Water Examiner, which, as reported elsewhere, opened on Monday last week, is being attended by such an array of Counsel and other representatives of the parties concerned, that the place originally assigned was found to be too small to accommodate them. The Companies have been accused of bringing forward these regulations now solely with the view of enhancing the value of their undertakings in the event of purchase. They repudiate any such intention. They are simply endeavouring, as pointed out by Mr. Walter Hunter in a letter to "The Times" last Tuesday, to carry out the recommendations of the Royal Commission; and they leave their case in the hands of the tribunal to which it has been referred, without the least fear of their motives being misinterpreted by the gentlemen constituting it.

Messrs. George Glover and Co., Limited.—For family reasons, Messrs. George Glover and Co., of Chelsea, intend making themselves into a limited liability company. The business will be carried on as at the present time, under the management of Thomson Glover, George Glover, and J. William Glover.

Anti-Vibrators for Incandescent Burners.—As the result of an appeal to the Law Officers, Mr. W. R. Clay, of Bolton, has obtained a specific reference to his letters patent No. 17,679 of 1897 in the specification describing the asbestos ring-device adopted by the Welsbach Company in their burners, as mentioned by Mr. Sheldrake in his Eastern Counties Association paper last year on "Street-Lighting by Incandescent Gas-Burners," as reported in our issue for April 24.

ESSAYS AND REVIEWS.

HIGH-PRESSURE GAS DISTRIBUTION.

In the "Journal" for Dec. 4, there was put a definite question of great technical interest and much industrial importance, relating to the delivering capacity of gas-mains. The question was introduced by specific references to recorded information bearing upon the subject, and was emphasized by a challenge to all and sundry to justify or refute a suggested hypothesis. Not a word has reached us in regard to this matter, one way or the other. This silence of the technical world upon a point of such vital moment, is remarkable. It is likewise significant; but it is far from satisfactory, or creditable to the masters of the gas industry. We are not disposed to permit the advocates of gas distribution at high pressures, with the object of increasing the delivering capacity of the mains, to allow judgment to go against them by default. Surely, one little article did not knock this vaunted novelty in gas engineering practice on the head? Then, where is the defence? Silence usually gives assent; but we must have something more definite in regard to this question. It cannot be that the gas engineers interested in the subject overlooked the number of the "Journal" in which the problem was posed; but assuming them to have done so, we take the present opportunity for calling their attention to the unanswered query. If they have forgotten to write, let this second appeal jog their memory.

The question, be it here repeated, is simply that the delivering capacity of gas-mains under extremely high heads of pressure; not the content of mains, with compressed gas. It is passing strange that nobody has deemed it worth while to report having tested the matter by experiment. Yet the opportunities for such experiments must be fairly common. Take a case where a distant gasholder has to be filled through a special main, or a particular district is supplied by a trunk main of considerable length. The only other requisites for making an experiment on the delivering capacity of such a main under wide differences of pressure are some suitable means of driving the gas into it at one end, and a system of pressure-gauges. Thus it would be easy to ascertain the relation between the head of pressure applied at one end of the pipe, when delivering gas at full draught, and the pressure at the other end. Suppose the initial pressure to be 48 inches of water, and the pressure at the other end to be 24 inches. What will be the result of suddenly increasing the initial pressure by 12 inches? An almost instantaneous pneumatic effect would run through the mass of gas in the pipe; but by how much would the end pressure be increased? Let us venture upon a guess, and say that, with gas passing at the velocity corresponding to a loss of head of 24 inches in (say) three or four miles, the increase of pressure at the far end would be less than 1 inch. Of course, this is a guess; but it is very unsatisfactory to go on guessing in the dark. Let somebody with the necessary means of finding out tell, as a matter of fact, how the thing stands.

Meanwhile, we wait for a convincing response. For antecedent reasons, we are inclined to hold that there is an upper limit to the speed at which gas can be properly forced through either trunk or distributing mains. Probably, also, this limit can be very quickly and easily attained, without going into the region of extreme driving or sucking heads. So far as mere hydrostatic pressure is concerned, it is not likely that anything within the bounds of reason—say, under 50 lbs. per square inch—would materially hurt a well-made town gas. This classification would not include a gas heavily carburetted with a hydrocarbon vapour, which is not, strictly speaking, a "made gas" at all. But whether a highly complex gas, however thoroughly manufactured, would bear being rushed through mains at lightning speed, is another question. As a saving consideration, we venture to fall back upon our original hypothesis that it is physically impossible so to transmit any fluid, elastic or otherwise.

Friction settles it. Not merely the skin friction of the gas in motion against the "wetted perimeter" of the channel containing it, but the entraining friction of the gas upon itself, which grows out of the skin friction of the outermost layer, and extends ever farther into the moving mass as the velocity at the centre increases. It is little creditable to the workers in gas that, unlike their colleagues the water engineers, they have made so little effort to settle the mathematical data of this phenomenon of gaseous matter in motion. True, there has not hitherto been so much call for exact knowledge of the delivering capacity of gas-mains under pressure as in the case of water pipes and channels. The necessities of irrigation and sewage works have raised to the greatest importance the data to be taken into account in computing the discharging capacity of water-conduits; and the data of water pipe discharges are of scarcely less moment. In regard to the latter question, however, water-works engineers are safely tied to recognised maxima. These are their guides, which must be followed, but can by no means be forced.

The question of the delivering capacity of gas-mains continued on a like easy footing so long as it was only a matter of moderate requirements. Apart from the ruling idea that gas pressures in the distributing network ought to be kept as low as possible—an idea which is fast being discredited, although it is being held far too tenaciously by gas managers who ought to know better—the whole business of gas distribution, including trunk transmission, was essentially on a basis of low, physically insignificant pressures. To lift a gasholder is only a question of from 3 inches to 9 inches of water; and when its time for working out came round, the gasholder simply returned its charge at the same pressures. There used to be a general impression among gas managers that there is a necessary connection between the amount of pressure given to a district and the proportion of unaccounted-for gas. Undoubtedly, with the old-fashioned style of distributing plant—the smallest and lightest mains, the poorest quality of service-pipes, and the roughest of workmanship—there was some ground for this belief; but as regards sound modern practice, it is a superstition. There is no real obstacle to rendering, and keeping, a gas transmission or distributing system as tight as a bottle. This is wholly a matter of the ideal accepted by the responsible engineer. If he is resigned to the thought that a certain amount of leakage from gas mains and services is unavoidable, he will find it so, and probably rather more than he likes. The most enlightened authorities on this branch of technics have, however, for many years set up the standard of absolute soundness for distributing plant, and have realized it.

It can be said, with perfect confidence, that the high-pressure transmission mains of the Gaslight and Coke Company from Beckton, and those of the South Metropolitan Company from East Greenwich, are quite gas-tight throughout. The same condition has been secured in many smaller examples. It is the same, originally at any rate, with the services laid in a proper way. Only, naturally, small mains and services, being subjected to many strains, sometimes leak accidentally. There is no good reason, however, in the conditions and character of gas transmitting and distributing plant, why the hydrostatic gas pressure should be kept low. The proposition may be laid down that there is no necessary relation between the amount of pressure in the district and the ratio of unaccounted-for gas to the output. If there is such a relation, it is due to bad management, which is a worse evil than a fraction of unaccounted-for gas. Proof of the soundness of this contention may be found in the proportion of 3·3 per cent. of unaccounted-for gas shown in the last published accounts of the Gaslight and Coke Company, all of whose district pressures rule high.

A good pressure in the district pleases the public, and is money in the pocket of the gas manufacturer. Even where, owing to unfavourable conditions in the past, the distributing system is not of the best, it pays to give the public all the gas they want. Besides, gas-stoves, gas-engines, and incandescent gas-burners—all the modern appliances for using gas to good advantage—in brief, are high-pressure consumers, compared with the old order of things. Any amount of pressure, governed at the point of consumption, is the rule to work by, nowadays. This truth, recognized either in itself or by its effects, has led gas engineers to adopt various expedients for increasing the pressures in low-lying districts. It is admitted that the top lifts of large modern gasholders do not as a rule give enough pressure. Also, certain long lines of trunk main fail to deliver as much gas as is expected of them. This is the opportunity for the "booster" system of pressure-increasing blowers, as used by the South Metropolitan Company. There is a future for this principle in gas distribution.

All the foregoing leads back to the original question of the practicability of extremely high-pressure systems of gas distribution. Can they play a useful part in the gas engineering practice of the future? That is the "poser" which must not remain ungrappled with, if the affirmative response is a possibility. Let us hope that, before another two months have passed—it is rather longer since we first put the question—there will be placed upon record at least something positive by way of information bearing upon the point at issue. It is hardly to be expected that any single experience should be absolutely conclusive; but every little bit of information, if only it is really reliable, will help forward the cause of Truth.

ELECTRIC LIGHTING MEMORANDA.

The London County Council and Tramway Traction—Exhibit of Conduit Systems—The Riddle of Rochdale.

The London County Council thoroughly act up to the spirit of the counsel to "make haste slowly," in matters electrical. They have been about fifteen years getting ready to light the Victoria Embankment by a special installation of arc lamps; and for the last four years they have been occupied with the problem of the conversion of the London tramways to electric traction. Nobody is likely to blame them for this last delay—we least of all—because the solution of the problem which is now emerging from all this consideration is precisely of the character that has been favoured in these columns all along. There has been something to wait for, as regards the tramways matter; and as the technical direction of the studies of the Committee was in the best hands, the London public could well afford to let other people make the mistakes inseparable from hurry. We have always contended, as the first of essentials, that the American overhead trolley wire arrangement is not good enough for Tramway London. Our electrical contemporaries have been in substantial agreement with this opinion, although, in their excusable zeal for the advance of electric services of all kinds, they have sometimes appeared willing to approve of almost anything so long as it was electrical. This natural prejudice, we believe, has led them, against their

better judgment, to accept the overhead trolley wire for situations where its suitability is at least questionable. Liverpool to wit.

In regard to Tramway London, our second contention has invariably been that the most difficult of the problems presented by the streets should be attacked first; and it has been argued that the Elephant and Castle district ought to be tackled as the *crux* of the whole business. This is what has actually been done. Dr. Kennedy, the Consulting Engineer, some time ago carried his Committee, and the Council, with him in declaring for a conduit system of distributing the working current. This decision has been criticized, of course, by those who have committed themselves to the more rough-and-ready overhead wire system; but these gentlemen must be classified as belonging to the same category as the fox who lost his tail. Speaking of the terrible Liverpool affair, somebody ventured to say the other day that, under the same climatic conditions, an underground slotted-conduit system would not have worked easily. Perhaps not. A heavy fall of snow, such as brings overhead telephone wires about the street passengers' ears, is likely to cause trouble in connection with a slotted-conduit underneath the road surface; but not in the same degree, nor in the same way as in the Liverpool case. In the rare event of such a snowfall as blocks railway trains, even the conduit-worked electric trams might cease running for awhile; but this would not be a matter of life and death. At any rate, the new London electric tramways, when they come into being, will have safe underground conduit distribution of the current—at least for the busy central districts. Last week a first public display of the methods so far perfected for attaining this object was given to representatives of the Metropolitan Borough Councils at the Camberwell depôt of the Council, where two short lengths of tramway have been laid down and equipped according to the different systems adopted by the Westinghouse Company, and developed by Dr. Kennedy respectively. Whichever plan is ultimately preferred, it should be made quite clear that all the facilities offered by the conduit for the prevention of electrolytic action outside will be properly utilized.

The people of Rochdale are still enjoying the Christmas diversion thoughtfully provided for them by their Town Council. This seasonable game, as we have already explained, is in the form of a riddle called the maximum demand system of charging for a domestic supply of electricity for lighting purposes; and the puzzle is to find out what any consumer will have to pay for electric light on the prescribed scale. So far, nobody has succeeded in solving the riddle; and even the Chairman of the Committee (Alderman Petrie), after being severely "heckled" about it at the last meeting of the Council, was fain to beg his questioners to wait until the next quarter's bills come in. Then they will see what the Corporation electricity has cost them. This way of disposing of the riddle of Rochdale, however satisfactory it may be to the members of the Corporation who made themselves responsible for putting it about, hardly meets the point of hostile criticism. People naturally want to know the price of the thing they are asked to buy; and it is not businesslike to put them off until the quarterly bills are made out. Rochdale people, especially, are not accustomed to do business in this way, which appears to be so contrary to the spirit of cash trading, to say nothing of the principles of the native co-operative movement.

One town councillor after another has protested against the uncertainty as to the price of electricity which is of the essence of the maximum demand device; and its unfairness to those who for any reason have occasion to use more lamps than usual, has been disclosed. Indeed, the Committee have been unable to resist the attack on the latter ground; and they have accordingly resolved upon a concession which places the whole affair in a light such as is rarely seen off the comic opera stage. If any Rochdale gentleman who proposes to emulate Hans Breitmann, and "gif a barty," will only take the precaution to send 48 hours' notice of his hospitable intent to the Town Clerk, or somebody else, a man from the Corporation electricity works will be sent to uncouple the maximum demand indicator, and leave it uncoupled for 24 hours, so that the customer's maximum demand for the quarter will not be affected by that single night's jollification. "The Committee are prepared to do this three times a quarter"—such is the official announcement; so that Rochdale now knows what is municipally regarded as a fair allowance of merry-making per annum. There must be a strange lack of humour among the serious-minded persons who constitute the Rochdale Town Council, or this farcical offer would never have seen the light of publicity. Joking apart, however, the incident goes to illustrate the hopeless amateurishness so often exhibited by municipal traders. Some might go so far as to call it an example of the childish way in which British municipalities play with electricity supply; for it is not business. In the nursery, possibly, where "playing at shops" is occasionally indulged in, something of the kind might be esteemed both sensible and enterprising. But to dream of carrying on an important municipal supply undertaking by the aid of such puerile "dodges," is a piece of trifling one would scarcely look for in Lancashire.

A clear indication that there is likely to be a serious drop in the price of gas coal within the next few weeks, is furnished by the fact (of which we have definite advice) that gas coals were offered last week in the Newcastle district at 7s. 6d. a ton at the pit—an isolated case, no doubt, but showing the trend of prices.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 485.)

THINGS on the Stock Exchange showed a decided improvement last week. Not that there was any extraordinary revival of activity—though it may come later on; but the tone was bright and buoyant throughout, and the public seemed to be getting over their shyness. Prices in almost all departments showed a more or less considerable advance; the gilt-edged division, with the Funds at their head, being in the front rank. The Exchequer Bond issue and the settlement engaged most attention; and the latter appears to have gone through smoothly. In the Money Market, there was a strong and steady demand in connection with the last-mentioned matters and other purposes; but discount rates fell so persistently that there is good ground for speculating on a reduction of the Bank rate next Thursday. In the Gas Market, business was on a decidedly restricted scale, even quieter than last week; but the general tone exhibited a considerable improvement. Several issues have made fairly solid advances; and they are to some extent representative of their class. Indeed, the prices at which some of the leading securities figure are remarkable, considering the hard times the companies are going through, owing to the late rise in coal, and the resulting reductions in the dividends now in course of declaration, and those to be declared six months hence. In Gaslights, the ordinary was only moderately active, but was very steady, and on Friday it touched 97½ *ex div.*—the best price of the week. The secured issues were not conspicuous in any way. South Metropolitan was hardly dealt in at all, but was very firm, standing at a price which yields only about 3¾ per cent. for money. A little business was done in Commercials; and both these issues had a slight improvement. In the Suburban and Provincial group, Brentfords had a good rise. The Continental Companies were very quiet indeed, but were strong; Union and Imperial each gaining a couple of points. None of the undertakings in the remoter world offered anything calling for notice. In the Water Companies, business was at a very low ebb. Prices were mostly firm. The dividend just declared by the New River Company is ¼ per cent. lower than the previous rate.

The daily operations were: Business in Gas was tame and uneventful on Monday; but the tendency was firm, and prices were good. Continental Union advanced 2. Tuesday was, if anything, quieter still; quotations did not move. Wednesday was a shade livelier; but still nothing moved. Thursday was not full of transactions; but there was more movement in prices. Brentford old rose 4, ditto new 2, and Imperial 1. Southwark Water receded 1. Friday was as inactive as any day in the week. Commercial new rose 1. Saturday was quiet but buoyant. Both Brentfords and Commercial old rose 2 each; Imperial 1.

A HANDBOOK TO LONDON GOVERNMENT.

THE "London Manual for 1901*" is materially larger than its predecessors, owing to the inclusion of full accounts of the constitution and work of the new Borough Councils, as well as the full text of the London Government Act, 1899. It is a very complete handbook to the Government of London, so far as design goes. It is a pity, however, that the execution is not more carefully done. In noticing previous editions we have called attention to several mistakes in the sections devoted to water and gas supply. Some of these have been removed; others remain; while yet others have been added. For instance, on the very first page relating to Gas Supply, we read: "In the case of the Gaslight and Coke Company and the Commercial Company an increase of ¼ per cent. is allowed for every decrease of 1d. per 1000 cubic feet. In the case of the South Metropolitan Company, since the conversion (in 1896) of its stock from 10 per cent. to 4 per cent., an increase of one-tenth per cent. is allowed for every decrease of 1d. per 1000 cubic feet, the standard price for the sliding scale being 3s. 6d." We wonder how long it will be before the Editor of the manual will discover that the Gaslight and Coke Company have carried out a similar stock-conversion scheme to that of the South Metropolitan Company? It is, moreover, not accurate to imply that the standard price for the three Companies is 3s. 6d.

On the following page, the price charged by the Gaslight and Coke Company north of the Thames at December, 1899, is stated to be 2s. 11d. It was 3s. per 1000 cubic feet. Again, the Gaslight Company is erroneously stated to have derived £23,784 of revenue from "meter-rents" in the June half-year of 1900. The Company charge rent for stoves but not for meters. The amusing sentence is still to be found in the section on water supply, in which the consumer is informed that "a Company is not bound to tell you the amount due, *or to give notice that it is not due* . . this is the law, and it is as well to know it."

One of the most disappointing features of this book is its maps—so singularly futile. One, "showing" the lines authorized and proposed to be worked by electric traction in the western suburbs of London, might be useful if it could be deciphered, and if it were on a sufficiently large scale for it to be possible to discover

* "The London Manual for 1901." Edited by R. Donald. London: Edward Lloyd, Limited; 1901.

whence the lines come and whither they go. As printed in the "London Manual," it is simply useless. So is that purporting to show the areas supplied by the several Gas Companies. It shows their relative sizes and positions (north, south, east, or west of each other); but as no street, area, or place is named on the map—the words "River Thames" are the only ones shown, other than the names of the Companies—it is impossible to determine within what boundaries the various areas are contained. The map of the whole areas of the Water Companies is suggestive of a bird's-eye view of London in a fog.

If the compilers of the "London Manual" did not attempt to do impossibilities (within the scope of the book), and would do with scrupulous accuracy what the exigencies of size allowed, its value would be considerably enhanced. A book of reference that is not absolutely reliable is but a delusion and a snare.

WATER BILLS FOR 1901.

(*Concluded from p.* 389.)

The Leeds Corporation Water Bill is to enable the Corporation to carry out additional water-works at an estimated cost of £2,750,000. The proposed works include a new reservoir, to be called the Colsterdale reservoir, for impounding the waters of the River Burn; a second similar work, to be called the Healey reservoir; a third to be called the Leighton reservoir, on the Pott Beck; and several others on the Carlesmore Beck, the River Laver, and the River Skell. There are 25 distinct works to be provided for. Compensation water is to be supplied from the Healey, Laverton, and Skelden reservoirs, in stated quantities. Lands are to be acquired within seven years, and the works constructed within ten years. Loans are to be repaid in 60 years.

The Mansfield Corporation Bill contains a part relating to water. It includes a clause to empower the Corporation to construct subsidiary works; repeals parts of the Mansfield Water Act, 1870; and proposes to give the Corporation the miscellaneous powers of a statutory water undertaking. The sum of £20,000 is to be borrowed for water-works purposes, repayable in 50 years. A schedule contains the portions of the Mansfield Water Act, 1870, which are to be continued in force.

The Margate Corporation Bill is to empower the Corporation to construct additional water-works and improve the undertaking, at a cost of £150,000. The area of supply is to be enlarged, conditionally on the supply in the extended portions being made effective in five years. The new works include a pumping-station, with wells and adits, in the parish of Wingham. The lands are to be acquired in three years, and the works completed within seven years. By-laws are to be made for ensuring the purity of the water. The rates for domestic supplies are to be increased from 7 to 8 per cent. Certain parts of the Canterbury, East Kent, and Mid Kent Acts are to be repealed. It is proposed to use the stock redemption fund instead of borrowing afresh.

The Rhyl Improvement Bill contains a part relating to water. A new reservoir is to be constructed, called the Dolwen reservoir, in the parish of Llanyfydd, Denbighshire. The waters to be impounded are those of the Dolwen stream; and the additional works are to be completed within seven years. The rates for domestic supplies range from £8 15s. per cent. upwards. Domestic supplies are not to include the watering of horses or carriage washing. The sum of £18,000 is to be borrowed for water-works purposes.

The Ripon Corporation Bill contains a part dealing with water. Additional works are to be authorized, for taking the waters of the South Gill Beck, to be completed within ten years. Powers of entry upon consumers' premises for the inspection of fittings are sought. The sum of £30,000 is to be borrowed for water-works purposes. Surplus profits from the undertaking may be spent in advertising the attractions of the city and neighbourhood.

The Rugby Water and Improvement Bill proposes to acquire lands and construct additional water-works, including a new reservoir, to be called the Newton reservoir, on the borders of Warwickshire and Leicestershire, to impound the waters of the Sawell Brook, a tributary of the River Avon. Parts of the works must be completed within five years, and the remainder within fifteen years. Bye-laws are to be made for preventing pollution of the supply. Extra rates are asked for, in certain cases of water-closets and baths, which could not be charged under the Act of 1863. The price of water sold by measure is not to exceed 2s. per 1000 gallons. Arrangements are to be made for compensating the owners of Rugby Mill and others. The sum of £150,000 is to be borrowed for water purposes, repayable in 60 years.

The Salford Corporation Bill is to enable the Corporation to obtain a further supply of water in bulk from the Corporation of Manchester. The preamble sets out the various arrangements and agreements between the two Corporations relating to water supply, and states that the present supply to Salford is entirely insufficient. The Bill provides for an unlimited increase of the supply, to be given on demand at an agreed price. Differences are to be settled by arbitration. The borrowing powers of the Manchester Corporation for water-works purposes are to be increased by the necessary amount, not exceeding £50,000, required to carry out the provisions of the Bill.

The Shipley Gas, Tramways, and Improvement Bill contains a part relating to water. It proposes to fine owners of houses not properly supplied with water, and provides for the cleansing of house cisterns. The sum of £10,000 is to be borrowed for water-works purposes.

The Stockport Corporation Water Bill is to empower the Corporation to acquire lands and construct additional water-works, including a storage reservoir on the River Kinder, in the parish of Hayfield, Derbyshire, and a similar work on the River Sett, in the same parish. A compensation storage reservoir is to be made on Hollingworth Clough. The quantity of compensation water is prescribed. Powers of entry are sought for the inspection of house-fittings. The new works are estimated to cost £756,000, besides £64,000 to purchase land in the drainage areas.

The Tees Valley Water Board Bill is to confer further powers on the Tees Valley Water Board in relation to the sale of surplus water in bulk to local authorities or companies requiring the same. Contracts of this nature are not to exceed 20 years' duration. The costs of the Bill are to be chargeable on the Corporations represented on the Board.

The Wisbech Water Bill is to extend the limits of supply by the Company to include a number of parishes named, in the counties of Norfolk and Cambridge. Additional works are proposed, including a pumping-station and well situated in the parish of Warham. Arrangements are to be effected with landowners for taking the water of certain springs. The new works are to be completed within five years. Additional capital to the amount of £30,000 is required, with one-third loan.

The Wolverhampton Corporation Water Bill is to extend the limits of supply to include several parishes in the counties of Stafford and Salop, under the customary provisions as to the supply being made effective within five years, and for sale of the outlying portions of the undertaking to interested local authorities. A well and pumping station are to be made in the parish of Worfield, Salop; and a reservoir at Tettenhall. These works are to be completed within ten years. Power of entry upon lands in the drainage area is required, so as to deal with cases of pollution. These works will involve an outlay of £200,000. The commencement of the sinking fund is deferred for seven years.

PERSONAL.

The property left by the late Dr. W. Pole, F.R.S., has been valued at £36,516.

Mr. J. Hall Rider, Chief Consulting and Resident Engineer for electric tramways and electric lighting under the Plymouth Corporation, has been appointed Electrical Engineer to the London County Council at a salary of £1000 a year.

Mr. James Horrocks has been appointed Chairman of the Gas and Lighting Committee of the Bolton Corporation, in succession to Mr. Alderman Miles, whose resignation of the position was noticed in the "Journal" for the 5th inst. Mr. Leonard Wild succeeds Mr. Horrocks as Vice-Chairman.

Consequent upon the death of Mr. John Read, the Directors of the Tunbridge Wells Gas Company have conferred upon Mr. Andrew Dougall, their Engineer, the additional appointment of General Manager, and have given Mr. Charles F. Catt, who has been in the office for eighteen years, the position of Accountant and Secretary.

Alderman Hugh Bell, Chairman of the Tees Valley Water Board, who for the past four months has been seriously ill, was able to preside at the meeting of the Board on Monday last week, and was cordially received by his fellow-members. It is understood, however, that he will have to leave England for a time to ensure complete recovery.

At the annual dinner of the employees of the Gas and Water Committee of the Goole District Council, held last Friday, reference was made by the Chairman (Mr. J. Cawthorn) to the good feeling subsisting between the officers and workmen and the Manager, Mr. Matt. Dunn; and, as a testimony of their esteem, he asked that gentleman to accept a handsome silver cigar-case, suitably inscribed. In acknowledging the gift, Mr. Dunn emphasized the importance of every man doing his best for his employers and working amicably with his neighbours to ensure the best results.

The Gas and Water Committee of the Hull Corporation have made arrangements (by an increase of salary of £150 per annum) to retain the services of Mr. F. J. Bancroft, their Engineer, for a period of five years from this time. This "wise diplomatic step" is commended by the "Hull News," as the Corporation can, it is said, ill afford to lose so valuable a servant—bearing in mind that Mr. Bancroft was one of the three selected recently for the vacancy at Birmingham. Of the proposed increase, it is mentioned that £100 will be paid to Mr. Bancroft as Engineer of the water-works, and £50 as Engineer of the gas-works.

Mr. A. B. E. Blackburn has been appointed, out of 120 applicants, to the position of Engineer and Manager of the Sunderland and South Shields Water Company, recently advertised in the "Journal." Mr. Blackburn, who is quite a young man, was articled to Mr. H. Ashton Hill, M.Inst.C.E., the Engineer of the South Staffordshire Water-Works Company, and remained with him as an assistant for the past two years. He has recently been elected a Fellow of the Geological Society, and has also passed the examination for associate membership of the Institution of Civil Engineers. He is Secretary of the Birmingham Association

of Students of the Institution. Previous to entering Mr. Hill's office, Mr. Blackburn took a three years' course in Civil Engineering at the Mason University College, Birmingham. It must be very gratifying to Mr. Hill for his pupil to have made so conspicuous a success.

OBITUARY.

Particulars were given in "The Times" last Tuesday, from the Berlin correspondent of that paper, of the career of Professor MAX VON PETTENKOFER, who committed suicide in Munich on the 10th inst. in a fit of depression caused by the infirmities of old age. He was born at Lichtenheim, near Neuburg, on the Danube, in 1818, and studied medicine at the Universities of Munich, Giessen, and Würzburg—confining himself more especially to the chemical branch of the science. After spending some time as an assistant in the Bavarian Royal Mint, he devoted himself to the study of hygiene. The insanitary state of Munich and the frequency with which the city was visited by epidemics of cholera and typhus led him to investigate the conditions governing the spread of these diseases. He convinced himself that a scientific system of sewerage and a good supply of pure water were the best preventives against epidemics. This brought him into a controversy with the "contagion school" of hygienists, who contended that the spread of a disease depended entirely upon the presence of specific microbes. The later development of hygienic science has shown that both he and his opponents were right. It is agreed that the diseases are carried by bacilli; but the importance attached by the Munich professor to sanitation, pure air, and good water is recognized as completely justified. Professor von Pettenkofer's investigations extended over the whole domain of hygienic science. He carefully studied the influence exerted upon health by differences of soil, air, food, &c.; and it has been claimed for him that he transformed what had been an empirical into an experimental science.

Lighting and Illumination.—We have received from "Holophane," Limited, a small pamphlet bearing the title of "Some Practical Hints on Lighting and Illumination." It contains a number of well-executed diagrams showing the effect produced by various kinds of globes upon the volume of light given out and upon the direction in which the strongest light is thrown; and they are prefaced by some useful remarks upon the effect of brilliant light-centres upon the eyes. With the high-power lights now in use, some form of glass globe becomes necessary to diffuse the concentrated beam; and the claim put forward for "Holophane" globes that they do this most effectually is fully substantiated by the diagrams. Illustrations are given of the effect produced by the three kinds of globes made by the Company; and they show that whether for table or desk lighting, general indoor illumination, or large interiors and street lighting they are equally suitable.

The Boiling-Point of Liquid Hydrogen.—At the Royal Society recently, Professor Dewar read a communication on this subject as determined by hydrogen and helium gas thermometers. He referred to experiments with a platinum-resistance thermometer, described to the Society in 1898, which had given the boiling-point of hydrogen as $-238{\cdot}4^\circ$ C., or $34{\cdot}6^\circ$ above the absolute zero of temperature. This result, however, depended upon an empirical law connecting temperature and resistance, which possibly might not hold good with such an exceptional temperature; so that he had sought confirmation of the result by other methods of investigation. He described the instruments and the methods used; the thermometric substances employed being hydrogen, oxygen, helium, and carbonic acid gas, and palladium in the construction of one of the instruments. One result of the experiments was to give $-239{\cdot}5^\circ$ C. as the boiling-point of the newly-discovered element, Neon. The boiling-point of oxygen was found by these methods to be $-182{\cdot}5^\circ$ C., and that obtained for hydrogen showed the former investigation to be substantially correct, but placed it even lower; for the average value obtained from the different experiments gave it as $-252{\cdot}5^\circ$ C., or only 21° C. above the absolute zero of temperature.

Automatic Electric Cut-Off.—The recent fatality resulting from the breaking of telephone wires in Liverpool invests with special interest some experiments carried out at Blackpool last Wednesday with an automatic cut-off invented by Mr. R. C. Quin, the Borough Electrical Engineer. By the use of this appliance, if telephone wires shall fall across a trolley wire, there would be absolutely no danger to the public, as the lines become "dead" as soon as the obstructive wire comes in contact with the live or electric wire; and if the latter fell it would also be harmless. A switch is controlled by a very strong spring, and this is released by a trigger, which is worked at either end by two electric magnets. One is connected to the trolley wire at a point most remote from the works, so that, should the wire break, the current is cut off from the magnet; the other is arranged so that, should an abnormal rush of current occur, due to the falling of a telephone wire across the trolley wire, the trigger is acted upon in a similar manner. One of the experiments was the cutting of a telephone wire, which caused a slight fizzle as it touched the trolley wire. Immediately, however, the automatic cut-off was brought into operation, and Mr. Quin pulled the wire down with bare hands. Half-a-dozen telephone wires were afterwards dropped across the live trolley wire with the same result. Finally the trolley wire itself was severed; but in every case the cut-off acted instantly.

NOTES.

Another Fireproof Flooring.

The newest form of fireproof flooring, now being used for the Government buildings in Westminster, is described by "Engineering" as the type made by Messrs. Mark Fawcett and Co., of Queen Anne's Gate. It meets the requirement of being self-contained—needing no scaffolding to support the concrete. Thus there is no risk of the premature striking of the centring, which has caused the collapse of so much work of this class. The framework of the floor is the usual rolled steel joists, carrying on their lower edges a system of hollow terra-cotta lintels, exactly like D-shaped gas-retorts. It is not the flat bottom of these lintels that bears upon the lower flange of the floor-beams, however, but a horizontal notch, cut in the sides immediately above this flat bottom. The effect is that the flat bottoms of the lintels come together in line beneath the bottom of the joists, which are thus shielded from the direct contact of fire. The lintels run diagonally, which greatly facilitates the construction of the floor. The under side of the lintels takes the plaster for the ceiling of the room below, which therefore does not show the character of the construction; while on top they are covered in and finished off to a flat surface with breeze concrete. The partitions are made of the same concrete; and the dormer slopes are constructed similarly to the floors—the terra-cotta hollow blocks being simply laid to the desired slope, and finished off with concrete. The construction should be a particularly safe one, and very strong.

Swedish Peat as a Coal Substitute.

Active measures are being taken by the Government of Sweden to improve the utilization of the immense peat resources of the country, as an alternative to buying expensive English coal. It is stated that in the iron-mining district the use of peat fuel is already in full progress; while plans are being prepared for the erection of peat factories to prepare the native material for burning on the local railways. At the Motala Shipbuilding Works, peat is used in gas-generators. Elsewhere, also, the gasifying of the peat previous to burning it as boiler-fuel seems to be an accepted improvement on older methods. Peat briquettes and peat dust-fuel have also been tried with some success. The best briquette machine is a German article, by Brunius, which makes octagons of highly-compressed peat. There are, however, several others almost equally well spoken of. Of course, peat will not make illuminating gas, nor drive successfully a railway locomotive with a furnace designed for burning good English coal; but for many other industrial purposes compressed peat will answer quite well. The demand for English coal, which last year amounted, for Sweden alone, to 100 million kröner, might thus be considerably reduced. The Norwegian Government are also studying the question—likewise impelled by the exorbitant prices of English coal during the past year. In this way, although the period of excessively dear coal was short, its effects in instigating fuel consumers to find a suitable substitute are likely to prove enduring.

Vibration of the Ground through Gas-Engines.

In a communication presented to the Society of Natural Sciences of Neuchâtel, M. Schardt dealt with the oscillations of the ground produced at Chaux de Fonds by a gas-motor. Last year a building was constructed in the neighbourhood of the gas-works to contain two motors, each of 250-horse power, to supply electric current in case that obtained from Combe-Garot should be accidentally interrupted. Only one of the motors is now in position. When the trials were made, it was found that it caused oscillation of the building, which was transmitted to houses in the vicinity. The motion was perceptible on the first floor; but at the roof it was very much more noticeable. There was something remarkable about the transmission of these vibrations. All the neighbouring houses were not affected. Those in which movement could be perceived were all situated in a direction forming an angle of about 50° with the line taken by the pistons. Besides, very violent oscillations were produced in houses about 200 yards from the works, though there were three intervening rows in which nothing whatever was felt. It was thought that the vibrations might be stopped by placing both motors on the same foundation, with the pistons moving in opposite directions. The fact that motion was perceptible in some houses and not in others has been explained by a phenomenon similar to that of resonance. A metal bar subjected to the influence of vibratory motion only vibrates when its dimensions are such that the duration of the vibrations it produces is in a given ratio with that of the vibrations causing the excitation. It is concluded that it must be the same for a building which, standing on ground oscillating in a given degree, will oscillate or not according to its dimensions.

Non-Electrolytic Traction Systems.

Further information supplied by the "Engineer" Special Commissioner who has inspected the Ganz electric traction system at Buda-Pesth—the same that is spoken of as being most likely to be adopted for the conversion of the Metropolitan Railways to electric traction—confirms the statement made in our "Electric Lighting Memoranda" of the 5th inst., that with this system there will be no electrolysis of street mains. This feature appears prominently in the account of the automatic liquid rheostat which

is employed in regulating the speed of the Ganz motor. The liquid is a solution of sodium carbonate, contained in an iron box. The writer of the description admits that the liquid and the box together incidentally illustrate one very important advantage of using alternate current motors upon electric railways. With continuous current, the complaints of electrolytic destruction of gas and water mains by vagrant earth returns have become loud and insistent. The earth branch of the three-phase alternating current produces no electrolytic effect, which is proved by the complete absence of electrolysis in the Ganz liquid rheostat. One such box has been in use now for three years, without producing any observable effects upon the iron. If any such effect existed, the iron of the box would wholly disappear in a few weeks. Neither upon the metal nor upon the liquid does the alternating current have the smallest electrolytic effect. This consideration settles the attitude of gas and water works engineers to the Ganz system of traction. Meanwhile, it is reported that the Schuckert system of surface-contact tramway traction, with the alternating current, is promising well; and progress is being made with the Westinghouse alternating conduit system. So that if the railway companies and tramway authorities will but wait a little longer, the probability is that they will be delivered from the necessity of using the direct-current overhead trolley-wire system, which is both dangerous to life and productive of electrolysis.

COMMUNICATED ARTICLE.

BUSINESS SKETCHES IN AMERICA.

SOME METHODS WORTH EMULATING.

By E. W. T. Richmond.

(Concluded from p. 396.)

"Hark, countrymen! either renew the fight,
Or tear the lions out of England's coat."

"First Henry VI.," Act I., Sc. 5.

In Canada. In Canada, I found the same eagerness to push the consumption of gas by all companies as in the States; but there is the initial difficulty here that the towns themselves are not developing so fast.

Hamilton. The Hamilton Gas Company supply coal gas at $1 per 1000 cubic feet; and they have no natural gas. The coal for this Company comes from Ohio with a 53 c. (2s. 2d.) per ton duty. Their make is 90 million cubic feet; and they are obtaining an increase of 15 to 20 per cent. per annum. The gas has an illuminating power of about 20 candles. The Company have regularly four advertising spaces in the daily papers. A few slot meters have been fixed; and the city streets are lighted entirely by electric arc lamps.

Toronto. A very fine city is Toronto, thoroughly English, and yet with a spice of Americanism about it. The gas supplied is a mixture of coal and water gas, in the proportion of 60 to 40. The illuminating power is 20 candles; and the make 838 million cubic feet. The charge for gas used to be $1·5, or 4s. 4d., per 1000 cubic feet; now it is 90 c., or 3s. 10d. In 1878, the Company commenced to make their own stoves, but found it did not answer, and in 1892 abandoned it—leaving the manufacture to those who devote themselves to the industry. They have no coin meters.

Ottawa. The public buildings of Ottawa are imposing; but there is not much else to be seen there. A mixture of coal and water gas is supplied at $1·50, or 6s. to 4s. according to consumption. The Company have now an equal day and night output; and they are expecting to increase the day consumption, and to sell more in summer than in winter. They are not subject in Ottawa, or in fact anywhere in Canada, to the competition existing in the States. The sale of gas is 60 millions, with a population of 55,000; but only half the city is laid with mains. The concern is controlled by the Imperial Continental Gas Association; and I found that Mr. Corbet Woodall had paid a visit of inspection three weeks prior to my call.

Public Lighting. Electric arc lamps entirely illuminate the streets of Ottawa. No gas has been used in the streets for some years past; but the Gas Company are hoping to make a change in this direction in the near future.

Sir Wilfrid Laurier. Remembering my good fortune in interviewing Mr. McKinley, I called at the office of Sir Wilfrid Laurier, the Governor of Canada, and was very kindly received by him. He conversed freely and agreeably on many subjects; and expressed himself as greatly pleased at the appreciation we had shown at home of what Canada had done both as regards the Canadian contingent in South Africa and the preferential tariff question.

Montreal. Concerning Montreal, I learnt that gas is sold at from $1·20 to $1 per 1000 cubic feet; and then as low as 90 c. for a consumption of a million and upwards. Meter-rent is only charged in the summer time; and the Company have succeeded in placing 10,000 coin meters. The quantity of gas sold is 100 millions per annum; and the average consumption per slot meter is 12,000 cubic feet—some of them begin supplied with cookers. The Company sell gas for furnace heating, for which they charge a special rate of 60 c. per 1000 cubic feet. Coal for Montreal is obtained from Cape Breton; and last year it was purchased as low as $1 (4s.) at the pit's mouth. Purchasers have had to pay more during the last few months; but still a wide margin exists between their prices and ours in Great Britain.

Where Arc Lamps Fail. The streets are lighted with electric arc lamps (for which the city pay $124·10 per lamp per annum), and partly by gas. The Company have 700 lamps. The reason of this is that the city streets are lined by many trees; and they obscure the arc lights. In such places, gas-lamps are used, fitted with ordinary flat-flame burners, consuming 5 feet per hour. Some few and more obscure streets are lighted by incandescent electric lamps. One suburb is partly lighted with gas, using Welsbach burners, of which, I think, there are about forty or fifty in use.

A Large Combine. Since my return home, I learn, through the "Morning Post" Montreal correspondent, that the largest trust ever formed in Canada is now in process of organization in that city. It is known as the Lighting and Power Company of Montreal; and it will include all the companies now supplying the city with illumination and power. These will include the Royal Electric Company, the Lachine Rapids Hydraulic and Land Company, the Chambly Manufacturing Company, and the Montreal Gas Company. The capitalization is put at £5,000,000. The Montreal Legislature will be asked to change the Act of Incorporation of the different Companies so that all the newly-acquired shares of the stock can be voted on at the next annual meeting. One who has a big interest in the new combine announces that, while there will be no immediate advance in the price of gas, the Corporation will be compelled to raise the present price of electric lighting and power. Electricity, he said, is now being supplied at Montreal at a loss, because of the strong competition among the different Companies. There is much opposition to the combination on the part of consumers; and a powerful lobby will be sent to the Provincial Legislature to try to block the scheme. The Directors, however, profess to have no fear of the failure in their enterprise.

Quebec. Inquiries in Quebec elicited the information that gas is there supplied at $1·25 for fuel purposes and at $1·75 to $1·25, according to consumption, for lighting. There are a few slot meters in use, but not many. The make is 50 millions per annum; and the population 65,000. The Company canvas for day consumption and advertise. The city and suburbs are lighted throughout by arc lamps. It was very delightful to be whirled about the long snow-covered streets, in a fur-rugged sleigh, with the lights from the lamps in the shop windows reflected in the dazzling snow. It must be a difficult matter to deal with the question of services for many months in the year in this land of frost and snow.

The Remarkable Experience of Boston. In Boston, both water and coal gas, in about equal proportion, is supplied at the price of $1. Boston has had a remarkable experience in gas supply. The existing Company comprises the original Boston Gas Company, the Brookland Company, the Roxsburgh Company, the St. Brixlow Company, the Dorchester Company, &c. Across the Mystic River, there is a rival, called the New England Company. The Boston Consolidated Company have 75,000 consumers out of a population of 500,000; and there are 8000 coin meters in use. The make of gas is 2500 millions. Under the old order of things, two or three companies (as in other cases) supplied the same streets.

The New England Company across the river has been formed to make gas coke and liquor by means of the Otto-Hoffmann coke-ovens.* The residual in their case is the coal gas, which is enriched until it attains 18-candle power. The enriched gas is delivered into the town; and the poor common gas—of from 4 to 9 candle power—is used under the ovens. In case this does not at any time afford sufficient heat, the service is interchangeable—that is to say, the 18-candle power gas can be turned on. The Company make a delivery of 6 to 10 million cubic feet per day of 18-candle power, of which the Boston Company buy the largest quantity. The Otto-Hoffmann plant is very interesting; and the New England Company's installation is certainly unique.

Allentown. This may be taken as a typical country manufacturing town, with a population of 20,000. They are, however, as keen in developing consumption as the larger towns; and in hotels, directories, and other places where the public eye will meet them may be found the United Gas Improvement Company's advertisements, as this is one of the gas concerns run by that ubiquitous Company.

The Massachusetts Commissioners. Of the Massachusetts Gas and Electrical Commissioners and their objects and work, readers of the "Journal" have been kept well informed; and therefore no extended reference to this useful organization is necessary here. It was of interest, however, to learn that the tribunal has now been in operation fifteen years, and practically no abuses have crept in. Their authority has never been unfairly exercised. The members are appointed by the Governor on a term of about five years of office. The Commission undoubtedly make this State the best for the gas investor, and the worst for the company promoter. Opinion in favour of such controlling bodies is luckily spreading in other States.

* Mr. Richmond advises us that a complete plan of these works is on the way from Boston. It has not arrived in time for inclusion in this article; but it shall be published in the issue of the "Journal" following its arrival.—Ed. J.G.L.

THE WORLD-WIDE USE OF PINTSCH GAS.

For lack of a more convenient place, I should like to introduce here some additional information received since the article appeared in which I dealt with the Pintsch system of lighting. The new statistics are extremely interesting, as they show how the system has established for itself a name and a home in every quarter of the globe, and the extent. The statement gives the equipments of the Pintsch system on railway cars, locomotives, buoys, &c., made up to the end of 1899.

	Cars.	Locomotives.	Gas-Works.	Buoys and Beacons.
Germany	36,305	3,784	71	98
Denmark	45	..	3	21
England	18,290	18	87	236
France	5,425	..	22	238
Holland	3,166	114	9	60
Italy	1,528	...	4	15
Switzerland	380	9	1	..
Austria	3,211	..	10	1
Russia	2,275	57	13	13
Sweden	475	8	4	2
Servia	154	..	..	..
Bulgaria	33	..	1	..
Turkey	103	..	..	..
Egypt	2	..	3	112
Canada	49	..	2	46
Brazil	974	31	1	31
Argentine	1,041	..	10	2
Chili	46	..	1	..
India	7,744	..	10	..
Australia	2,053	..	3	29
United States	14,883	..	51	134
Total	98,182	4,021	306	1,038
Increase for the year	7,292	367	3	146

THE LESSON AND A HOPE.

I have now almost denuded my notes of specific information; but, in addition to what I have already written, there are a few other points I wish presently to make, in order to emphasize and expand the particulars that I have already given as to the enterprise of American Gas Companies in developing the use of gas for purposes other than lighting, for it is in that direction that English Companies may extract a lesson. I have shown what New York, Chicago, Trenton, and numerous other places have done; I have spoken, and given precise figures, as to increases in stove outputs in short spaces of time such as, in comparison with the total number of consumers, the gas authorities of our own country have never dreamed of. I hope—not, I trust, in vain—that my figures will set them thinking, and inspire them to follow in the footsteps of our American friends. The stove manufacturers of America do not push the business so much as do the makers in England, although such enterprise is not welcomed in all English towns. But, as I have been able to show, the American Gas Companies themselves take up the work with enthusiasm. Their advertisements, which they issue broadcast, are to be found side by side with the stores announcements, in newspapers and directories; and generally they appeal to the public in the same way, and through the same channels, as other commercial concerns. Of course, a remarkable feature of American Gas Companies' environment is the possibility of opposition; and this spurs those in possession into exercising an amount of enterprise and determination to secure the largest custom possible in order to fortify themselves against competition. But all the same, the result and the lesson of their methods stand before us. It seems to me a pity that, with so sure a foundation as our laws give to Gas Companies, there is not more determination to make the most of their unrivalled opportunities. There can be no loss of dignity in British gas authorities taking a leaf out of the books of the American authorities in this respect; they have already done so in connection with water-gas manufacture. On the other hand, they can offer to the American authorities something in the way of improved and economical methods of coal-gas manufacture; so that there will be no indebtedness on either side.

PROTECTION *versus* DESIGN AND EFFICIENCY.

With reference to the remark in the foregoing paragraph, as to the apathy of the American gas-stove makers in assisting in extending the demand for stoves, I have an impression that this is traceable to the influence of the high protective tariffs of the country, which shield them from rival imports; and I venture to say that a little more active rivalry would do them no harm. The duty on imported goods in some cases is as much as 45 per cent.; and therefore effectually prevents all outside competition. I have confidence that the construction and design and character of the English stove is such that the manufacturers in this country have no need to fear the competition of even the improved American stoves, although we have no protective duties. The chief trade is done in a double-oven cooker, with the gas-burner underneath the baking oven—out of sight, and not readily cleaned, adjusted, or even lighted. The type of stove, in fact, is somewhat similar to those which used to be sold pretty generally in this country some fifteen years ago.

ENGLISH COINAGE AND WEIGHTS AND MEASURES.

In making comparisons, among the thoughts which crowd into my mind is this, that in the event of the issue of new coinage on the ascension of King Edward VII., we might, with advantage, approximate the English coinage to the American decimal system; and it would also be a good thing to bring our weights and measures also into line with the reasonable and simple decimal measures adopted on the Continent. It certainly does not appear that America will be long before they approximate their weights and measures to something approaching the simplicity of their coinage, as I heard continual complaints of our old-fashioned tables of weights and measures. To one anomaly in connection with weights, I referred in dealing with Pittsburgh.

ADDITIONAL DETAILS ON DEVELOPING CONSUMPTION.

As already hinted, I have a few more details which I can impart as to how consumption—particularly day consumption—is developed in America. Almost every, if not every, Gas Company that I visited advertise largely, canvass, and instruct; and they not only do this, but after a stove is placed, they make it their business to send an efficient representative to see that it is properly used and is giving satisfaction. It has been suggested there that the Gas Companies should form a National Advertising Bureau, with the object of advertising in all the leading monthly magazines of the country, so as to reach people who do not interest themselves in the local publications. The suggestion seems to me worth following up in this country. Then in the course of my travels, I learnt that the Standard Oil Company

A SUGGESTION FOR BRITISH GAS COMPANIES.

spent last year the large sum of £30,000 sterling in advertising and pushing the sale of vapour oil-stoves; and although they have no direct interest in the profit of the stove trade, they take a broad view of the case, and see that their profit is a continuous one, inasmuch as from them must come the supply of the oil used. I am informed that they find this policy pays. In my opinion, something of the kind might also be done by Gas Companies of Great Britain—say, by contributing to a common fund a certain agreed payment on their make, and then advertising in all the London and leading provincial papers the advantages of cooking and heating by gas according to the season. I am so sanguine of the results, that I have no hesitation in predicting that it would pay them at least twenty-fold.

NEWSPAPER ADVERTISING.

The United Gas Improvement Company and their dependent undertakings with their unique newspaper advertisements, the New York Consolidated Gas Company's leaderettes, and Mr. Moses, of Trenton's resourceful enterprise as a commercial engineer, appear to me to be the pick of America's advertising ability in the gas industry. Let us take a few of the numerous examples, and we shall find their subject-matter is as varied as their sizes. The compilation of these must have been a matter of intelligent study; and I only wish I could place them all before the gas companies of this country, as I feel convinced they would cause no little astonishment, and would instigate many to action in the same direction. But to reprint them all would, I should think, simply mean the occupation of a complete number of the "JOURNAL" from cover to cover. But an indication may be given of the character of some of the advertisements of the above Company and of the concerns controlled by them, without reference to the particular station from which they emanate. In one advertisement, special inducements are offered to consumers to adopt gas-stoves, the advantages of cooking and heating are stated, and a hearty invitation is given to call at the gas offices to inspect samples of stoves. "Is your gas service satisfactory?" is the question at the head of another advertisement; and it is followed by the assuring statement that "We want it to be so, and will make it so if you will give us the opportunity." "New burners" are offered "without charge" where lights are defective; and an appeal is made to consumers to notify the Company at once, by mail or telephone, in case of trouble. By the way, it is

COMPLAINTS BY TELEPHONE.

the custom in this country to discountenance the telephone for Gas Companies, because (I have been frequently told myself) customers would make use for it for complaints. Surely, if complaints are to be made, conveniences should be placed in the hands of the consumer to make them, with as little annoyance and delay as possible. Nearly all along the line, it seems to me the last person to be considered is the consumer. There are, of course, exceptions; but I am taking a broad and general view of gas companies' treatment of their consumers. I respectfully maintain that the time for this method of dealing with them has passed.

FURTHER ADVERTISING EXAMPLES.

Resuming, in another advertisement information is given as to what the Company are prepared to do *free*. Services are run free up to 50 feet; gas ranges are sold at less than cost, and set up free; Welsbach lamps are sold at from 60 c. up to $1·20, and are installed free; and all complaints of inefficient service are promptly and effectively answered free. "Just a word about Ironing" is the title of an advertisement showing the conveniences of the gas range in this necessary branch of domestic work; and a further one informs the housewife how to keep cool—the gas-range being the principal aid to promoting that desirable condition. "The servant question" is the bold top line of an advertisement which is bound to attract the attention of the perplexed and long-suffering housewife. A whole page of one newspaper is occupied by the words "Buy a Gas-Range $12," in bold script printing, together with the name and address of the local Company. "Use a Gas-Stove," "Hot, Sweltering Weather," "When Old Sol Beams and the Mercury Climbs, Get a Gas-Stove," "Use your Gas-Range in Winter," "Why You Should Use a Gas-Stove," "Get a Gas

Range," "Think It Over," "The Cost of a Gas-Range," "Not a Knotty Question to Solve—the Kitchen Problem," "Light a Match," "Only a Match," "A Hot Breakfast," "Don't Scold the Cook," "Preserving Time is Here," "Don't Worry," "Don't Waste Time," and "Coal is Scarce," are typical headlines of other advertisements, which are all of a class to draw attention. From the material in my possession, I could go on quoting almost *ad infinitum;* but the character of the United Gas Improvement Company's public appeals is sufficiently indicated, as is also the fact that they do not expend with a niggardly hand in their wise policy of keeping the advantages of gas prominently before the public in the many towns the gas supply of which they control.

The Mutual Gas Company have an effective assortment of readable slip advertisements for publication in newspapers. They, too, are worded and the type arranged in a way to catch the eye and to induce custom. Ranges are supplied and fixed complete for $6. The Consolidated (New York) Company's advertisement in the evening papers offers ranges from $3 rental a year, including repair; the announcement which I have before me being prominently headed "Good Cooks prefer Gas-Ranges," and the reasons why they do so are stated. Ranges on the same terms are offered by the Standard Company in similar advertisements. The Newark Gas Company have an advertisement headed with the one word "Gas" in type fully an inch deep; and many advantages of gas are clearly set forth in the succeeding matter. The Pensacola Gas Company go in for magnificent advertisements some 13 in. by 9 in., which cannot fail to appeal to the housewife, and in which they offer to set ranges on trial, or supply them for $13, connected free.

I think I have now given a plain idea of the extensive manner in which the American Gas Companies advertise in their ordinary local papers; but the advertisements I have mentioned do not by any means exhaust the mass of material I have by me. Nor are the Companies mentioned here the only ones who advertise; this plan of inviting and courting business is general among the Companies of the States and Canada. It is regarded as an essential to the development of a Gas Company's business just as much as of the store keeper's. And it pays; or we may be sure our 'cute American friends would not persist in it. Indeed with Hotspur they consider

"These things are the very life-blood, of our enterprise."

* * * * * * * *

"Give us bold advertisement, to see how fortune is dispos'd to us."

"First Henry IV.," Act IV., Sc. I.

Supplementary Methods of Advertising.

But at advertising, the Companies do not stop. Most of them circulate, with generous hand, a supply of literature to keep themselves ever-present in the minds of householders; and the days of competition, real and earnest, that have set in in almost every town in England will demand from the Gas Companies here the same unceasing vigilance to keep themselves well to the fore in order to retain what they have secured and to net more. From the United Gas Improvement Company, I received an excellent collection of pamphlets, leaflets, circulars, and almanacs. The last-mentioned are particularly pretty in design, and beautifully coloured and finished. The base of one which I have represents a gas-range, surmounted by a chubby boy in the garb of a cook; on the side of the range is affixed the leaves of the calendar, each of which contains the dates of a month, and bears an appropriate reference to gas ranges, fires, or burners. At the foot of the range appears the words "Compliments, the United Gas Improvement Company"—and not in a form offensive to the eye. These calendars commend themselves to me as a handy method of keeping gas and its uses perpetually under the eye of the rulers of domestic affairs. Of circulars making offers, and leaflets and pamphlets giving information, I have numerous examples from many sources. Most of them are tastefully got up, and contain sound advice, clearly expressed, together with full particulars concerning terms for stoves and other appliances, all of which are illustrated in many of the copies. Presumably with an eye to the future, the United Gas Improvement Company send out a little booklet containing "Mother Goose Melodies," into which are cleverly introduced allusions to gas and gas cooking, which will make a wholesome impression on the minds of the youngsters into whose hands they fall. Three pamphlets I have reserved from my pile for special mention as they have particularly taken my fancy. While they serve their advertising object, they are got up in such a style, and contain so much that the consumer will find useful, that unrequested all but the absolutely negligent will preserve them for future reference. One is issued by the Minneapolis Gaslight Company, and is entitled "A Handbook for Gas Consumers;" the second is distributed by the Consolidated Gas Company, and carries the title "Some Hints on the Economical Use of Gas;" and the third is circulated by the United Gas Improvement Company, and is faced by the words "Pointers for Gas Consumers." An allusion to the first will cover the three. In compiling this pamphlet, the author has endeavoured to comprehend as plainly as possible the more important facts relating to the use of gas, in the hope that the reader may receive essential knowledge and that causes for complaint may be entirely removed. The author fully recognizes (and this is a point that many of our English Companies do not apparently recognize) that the proper use of gas is a matter of education; and in this sixteen-page *brochure*, he packs quite a bulk of information. Starting with some wise advice about the piping of houses, the gas fixtures, globes and burners, he proceeds to show by illustration the perfect and imperfect forms of flame. Words of caution succeed; and an abundance of salutary information is imparted about meters and how to read them, which is calculated to promote greater confidence in those much-maligned arbiters of what is right between supplier and consumer. The subjects of gas cooking and heating are also lucidly treated; and the little book winds up with a list of rules for the consumer, which, if observed, cannot fail to protect him from harm. Some of the gas-stove makers also issue pamphlets; but those which came into my hands are not of such great merit as those issued by the Companies. Of course, I know quite well a number of Corporations and Gas Companies issue pamphlets, and do push the business in England. But what I wish to impress upon my friends at home is that this is the exception and not the rule; whereas in America it is the rule and not the exception to cater eagerly and extensively for day consumption.

Lectures and Fees.

While so much is done to secure extended business through the medium of publications of various kinds, the value of cooking lectures is fully recognized; and parsimony in making the arrangements is an unknown quantity. Accomplished lecturers, who are paid good terms, are engaged, good and comfortable halls are hired for the purpose, and in fact every inducement is put forward to attract. I learnt that the terms of one lady lecturer was $50 per week and expenses, which consist of about $2 personal expenses per day, and $3 per day cooking expenses, and $3½ to $5 for the maid.

Gas Companies' Literature and Advertisements Collected on My Journey.

The New York Gas Company have paid $75 per lecture for odd lectures, or $50 for a series of two lectures per week for four weeks. The Company take a Theatre or Opera House and advertise very largely, with the result that they fill the place with the best people in New York. They spend the large sum of $25,000 (£5000) per annum for newspaper work, subsidize schools of cookery, and generally do everything they can to push the trade; and they have their reward.

Finally.

And now, my self-imposed task is finished. Although it has absorbed some little time and involved labour in bringing the mass of notes I made into something like presentable shape, the work has not been without interest and pleasure. My thanks are due to the many friends from whom information has been so readily obtained, and also to the Editor and Staff of the "Journal" for the assistance they have rendered me in every possible way. I may say, in passing, if the readers of the "Journal" in this country saw the interest with which the records of the British gas industry are followed, it would undoubtedly be a source of gratification to them. Our American friends readily acknowledge they have many things to learn from us; and surely we in our turn can with repentant candour acknowledge their superiority in the directions I have indicated. If what I have written serves to stimulate fresh activity in the field of the gas business in which I believe are set the roots of the still greater development of the home gas industry, I shall be satisfied, even though the stimulation be of moderate degree. I cannot help feeling that the high-water mark of the gas-lighting business has been nearly reached. Progress will be made by the aid of prepayment meters and incandescent gas lighting; but that progress, I fear, will be to a great extent counterbalanced by the inroads of electric lighting, its expensiveness notwithstanding. Therefore, in my humble judgment, it is to the use of gas for other purposes that we must turn for any large accretion of gas consumption; this has been recognized in America. If my belief is right—aye, and even if it be wrong—a trial of the methods which have been found so fruitful in America should be made. I feel convinced that out of them good would come. Shall I watch in vain for quickened life on this most promising side of the British gas industry? I trust not. May I conclude with Shakespeare's exhortation in "Henry VI."—

"Defer no time, delays
Have dangerous ends."

TECHNICAL RECORD.

FUTURE OF THE LONDON WATER SUPPLY.

The prolonged discussion on the paper which Mr. R. E. Middleton, M.Inst.C.E., read on the above subject before the Surveyors' Institution in December, came to an end at a late hour on Monday last week.* The value of the paper and of the discussion lies in the fact that they have been the means of concentrating the principal features of the question of, and arguments surrounding, the London Water Supply, and the project for bringing Welsh water into the service of the Metropolis. On Monday last week, the discussion was opened by the reading of a communication by Mr. E. K. Burstal, who was unable to be present.

Mr. BURSTAL said the population supplied by the eight London Companies at the beginning of 1892 was approximately 5¾ millions; and the average consumption of water about 31 gallons per head. In November of 1891 and of 1900, constant supply was afforded as follows:—

	Nov., 1891. Per Cent.	Nov. 1900. Per Cent.
Chelsea	23	100
East London	98	99
Grand Junction	75	100
Kent	56	93
Lambeth	53	76
New River	44	95
Southwark and Vauxhall	77	93
West Middlesex	43	98

The great increase in the percentage of constant supply was a point upon which the Companies were to be sincerely congratulated. At the present time, the supply was afforded to about 6,200,000 persons at the rate of nearly 33 gallons per head per day. If the population had increased, as was anticipated, according to Mr. Middleton's figures, the number would have been 6¾ millions. It was therefore apparent that the population was not increasing at the rate that was anticipated. There could be no doubt but that a domestic supply of 17 gallons and a trade and public supply of 8 gallons were ample for London or any well-managed undertaking; or a total of 25 gallons per head daily. It was apparent that a loss of over 8 gallons per head daily was taking place, or approximately 50 million gallons a day, or a supply for an additional 2 million persons, or 30 per cent. more than the number at present supplied, as pointed out by his partner (Mr. E. H. Stevenson) and himself in a small pamphlet on the "Metropolitan Water Supply," published in 1892. This 50,000 gallons daily represented an expenditure for collecting, pumping, and filtration of £50,000 annually, and an expense of certainly £10,000 yearly in the additional quantity of sewerage which had to be dealt with by the London County Council at their pumping-stations. Comparing November, 1891, with the corresponding month of 1900, only one Company (the East London) had improved its position in the matter of checking waste. The other Companies had all gone on the backward path, thus:—

	Nov., 1891.	Nov., 1900.
Chelsea	33·87	45·25
Grand Junction	35·49	45·29
Kent	27·24	30·21
Lambeth	27·46	33·29
New River	26·85	30·25
Southwark and Vauxhall	29·97	36·19
West Middlesex	29·08	32·63

The notice recently published in the papers intimating that the Metropolitan Water Companies were intending to propose fresh regulations under the powers of their Acts of 1852, 1871, and 1897 was apparently an earnest of their intentions to bring the regulations of the Water Companies in London into harmony, and, it was to be hoped, more in unison with those prevailing in well-managed undertakings in provincial towns, such as Portsmouth, Nottingham, Norwich, Bury, Derby, &c. But, unless regulations similar to those were adopted in lieu of the emasculated regulations usually finding favour with the Local Government Board, they would be of little more use than those now existing.

Mr. WALTER HUNTER, in his opening remarks, said that although he was connected with Mr. Middleton as a colleague in carrying out the Staines works, he might be permitted to join in the congratulations upon the success which had undoubtedly attended his paper. Having observed that he agreed generally with the conclusions and deductions of the author in regard to the Welsh source of supply, he said he intended to confine his attention mainly to the question of the development of the Thames by means of storage reservoirs. The paper again raised the question of the Thames against Wales or other outside sources; and it divided itself naturally into four divisions: (1) What were likely to be the requirements of London in the future? (2) Is the quality of the present supply good? (3) Is the available quantity sufficient for many years to come? And (4), if Nos. 2 and 3 be answered affirmatively, the further question appeared to arise, which is the cheaper method of supply, and therefore the more advantageous to London? In regard to the requirements of London in the future, it was difficult to arrive at reliable figures so far as population was concerned. Generally, he agreed with the author of the paper; his figures being in agreement with the figures accepted by Lord Balfour's Commission, who considered the question up to 1931. At that time, they anticipated that, supposing London were to increase at the same increment as between 1881 and 1891, it might reach a population of 11¼ millions; and they took as the rate of supply 35 gallons per head per day. The speaker confessed that his Company were transgressors in supplying a larger amount than this; but he hoped by perseverance to bring down the average. He commented upon the waste aspect of the question, and referred to the reasonable regulations which the Companies are seeking to obtain to guard against waste. Mr. Middleton had arrived at the fact that about 717 million gallons of water would be required in 1961, 400 million gallons of which would be taken from the Thames. He agreed generally with these figures; but he intended to restrict his remarks to the 400 million gallons which would be required in about 40 years' time from now. Concerning the quality of the water, he said several speakers had doubts as to whether the Thames should be used as a source of supply; but if they turned to the reports of responsible bodies who had inquired into the matter during the past few years, they would see that the quality of the water was absolutely secured. In support of this statement, he quoted from the report of Lord Balfour's Commission. Since the date of that report, the Thames Conservancy (in 1894) obtained an Act which they had used with very great effect. There was a visible improvement in the raw river water; and Mr. Groves, the Chemist to the Thames Conservancy, stated, before Lord Llandaff's Commission, that the raw water only contained one-third of the impurities that it did eight or nine years ago. The eminently satisfactory reports of the late Sir Edward Frankland, and Sir William Crookes and Professor Dewar were referred to. In the report of the last two gentlemen for January this year, it was stated that the improvement since 1897 in the filtration (taking the number of microbes) in the Thames waters amounted to 55 per cent., to 70 per cent. in the case of the New River, and to something like 80 per cent. in the Lea. But it had always appeared to him (Mr. Hunter) that the truest practical testimony of the goodness of the London water was shown by the vital statistics of the Metropolis. They could not get over the fact that it was impossible to have a death-rate of 18 per 1000 in a city like London with an impure or imperfect water supply. He therefore ventured to state, with the greatest possible confidence, that the water supply of London was of excellent quality. Now as to the quantity of water obtainable, it was proved, by the evidence given on behalf of the Thames Conservancy, before Lord Balfour's Commission, that the average flow of the Thames over a series of years was 1350 million gallons daily. The minimum quantity which the Conservancy asked to be allowed to flow at Teddington was 200 million gallons per day. There was thus a balance of 1150 million gallons available for water supply, if only reservoirs of sufficient capacity were made to store the water. But he asked his hearers not to misunderstand him. The nearer they approached the ultimate capacity of the river, the larger would be the storage necessary; and there would be a time when the cost of reservoirs, pumps, and machinery would become greater than the cost of obtaining an additional supply from an outside source. The supporters of the Welsh scheme stated that the cost of carrying it out would be 38 millions; and for this sum they anticipated obtaining 415 million gallons daily. It was true they had abandoned this view, and now proposed the Welsh scheme as a supplemental one. He did not wonder at their change of front. What would happen if their scheme were carried out? After exhausting the Welsh supply, it would be necessary to revert to the present source, which the Welsh scheme supporters now affected to despise. The true solution was to develop and utilize the admirable water supply which the natural position of London secured to its inhabitants until the cost was greater than that of obtaining water from Wales or elsewhere. Whether it was advisable to secure now reservoir stations which might be utilized hereafter, was another question. To his mind, having regard to the increase in the population, the question of water supply was a national one, and ought to be treated on national lines, by which means the claims of all cities and towns and districts could be fairly considered and determined. These considerations naturally brought him to the fourth head: Which was the cheaper method of supply, and therefore the more advantageous to London—the quality being equal in either case. This question, of course, depended on the period. Lord Balfour's Commission took forty years into their view; and he (Mr. Hunter) thought such a period was sufficient for the present generation to consider, leaving the years afterwards to posterity. But as the evidence laid before Lord Llandaff's Commission covered the period up to 1948, at which date 400 million gallons might be required from the Thames, he took this as his ultimate limit at the present time. From his calculations, he arrived at the following figures: With the Welsh scheme for 121 million gallons daily supply, the works would cost £20,600,000. The Thames scheme for the same quantity would cost for works £5,340,000. The interest during the construction of the Welsh scheme would be £3,190,000; and for the Thames scheme £943,000. The capitalized pumping charges for the Welsh scheme would be £87,000; and for the Thames scheme £2,773,000. Thus for 121 millions daily supply, his estimate of the total cost for the Welsh scheme was £23,878,000; and for the

* The paper was given in the "JOURNAL" for Dec. 25, and a report of the first part of the discussion was published on the 22nd ult.

Thames scheme £9,057,000. Now taking an average total quantity of 214 million gallons daily supply, added to the 185½ millions which they had power to take from the Thames, making a total of 400 million gallons, the works for the Welsh scheme would cost £32,712,000; and for the Thames scheme £10,589,000. Interest during the construction of the Welsh scheme would be £4,283,000; and for the Thames scheme £1,617,000. The capitalized pumping charges for the Welsh scheme would be £173,000; and for the Thames scheme £5,278,000. The total result was that the total cost of the Welsh scheme worked out to £37,169,000; and for the Thames scheme to £17,486,000. In the case of the 121 million gallons daily, the cost of the Welsh scheme came out to about 2½ times that of the Thames scheme; and for a total quantity of 214 million gallons, it worked out to about 2¼ times. He showed, by a quotation from the report, that Lord Llandaff's Commission treated the question in a somewhat different way, but came to the conclusion that the Welsh scheme would cost 2⅜ times the cost of the Thames scheme for 114½ million gallons daily. As to the scheme described by Professor Robinson at the previous meeting, he was mistaken in supposing that £3,000,000 (more or less) compared with the £10,000,000 mentioned in Lord Llandaff's report as the cost of the Staines scheme. The latter figure included the cost of the engines for pumping the supply into the district—all the capitalized charges for pumping for store and for supply; the charges for connecting the mains to the service reservoirs of the Companies; and the charges for accumulated interest during the execution of the works. His (Mr. Hunter's) estimate for adequate reservoirs and pumping-engines to store amounted to £3,346,000. This figure was absolutely reliable, and it had been confirmed by the tenders for the carrying out of the work. Speaking of water companies generally, he mentioned that no public authorities in the world had done more beneficent service for the welfare, comfort, and convenience of mankind than had the well-abused bodies of whom he was a representative. The charges made for water were less in London than those in Liverpool, Manchester, Salford, and many other towns. Regarding the Staines scheme, which he had the honour, with the late Alexander Fraser, to formulate in the first instance, and the satisfaction of carrying out the first instalment with Mr. Middleton, he firmly believed it had saved London an expenditure of some 20 millions for the next twenty or thirty years; and he therefore hoped it had conferred at any rate some benefit upon the inhabitants of the Metropolis.

Mr. T. W. Wheeler, K.C., in the course of a long speech, gave evidence of his distrust of all statistics referring to the future growth of the population, and showed how fallacious predictions had proved up to the present. Both in regard to the population and the future water requirements of London, he thought the estimates were exaggerated. He considered an enormous economy might be effected by abandoning the use of doubly filtered water on the streets, and utilizing the tidal waters of the Thames instead for that purpose. As a judge and as a lawyer, his opinion was that there was nothing to justify the burden and expense of going to Wales for water at the present time.

Mr. H. Wilkins (Lambeth Water Company) referred to the difficulty that had to be faced owing to the amount of prejudice which had been introduced into this question of the London Water Supply, which even the patient and thorough inquiries of Lords Balfour and Llandaff's Commissions had failed to remove. However, one starting-ground had been obtained; and it was this, that the existing supply was adequate for present requirements in regard to quantity, and satisfactory also in regard to quality. The problem to be solved was thus the future supply; and it seemed to him that it entirely depended upon speculation. He also alluded to the improvement in the quality of the Thames water which had followed the extension of the powers of the Thames Conservancy; and then he asked, supposing the time should arrive when the Thames supply would require to be supplemented, whether it would be prudent to do so to a large extent by soft water. The inhabitants of London had become accustomed to the present water; and it was on that water that the death-rate had gone down from between 25 and 26 to 18 per 1000. Even the 18 included the high death-rate in insanitary and over-crowded quarters. The effect of soft water on lead, the colour of the Welsh water, and the fact that it was a stagnant water were also commented on. A still further point was made by the speaker of the fact that the Welsh water would have to be brought to London in a covered culvert; and thus sunlight and aeration, which were two important factors in the purification of water, would be absent. On the question of the quantity of water, he urged that much more information was required as to the capacity of the Welsh source of supply than had been given; it needed closer investigation, and over a much longer series of years. Looked at from the point of economy, they should certainly, as prudent men, fully utilize and develop existing sources before resorting to distant ones. It did not appear to him personally by any means impossible that Professor Robinson's scheme might not be wedded to the Staines storage reservoirs as a matter of river conservancy; it might be desirable to impound the head waters of the river so that they might at one stroke reduce the effect of both flood and extreme drought. He regretted the amount of ignorance that was shown in connection with the question of waste, and particularly did he deplore the attitude that was being taken by the public bodies in reference to the regulations which the Companies proposed for promoting the efficiency of their service.

Mr. Basil Ellis, having been, from boyhood almost, engaged in the practical carrying out of water-works (largely of London water-works), was quite certain that the works for obtaining water from the Thames Valley could be constructed at far less than the cost of going to an outside source.

Mr. W. R. Baldwin-Wiseman, M.Sc., F.G.S., remarked that in a discussion of the relative pumpings in sandstone and chalk, the nature and relative rate of flow in the two classes of rock was too often insufficiently considered. In the sandstone, there was a free flow through the interstices between the grains, while in the chalk it is more complicated and devious, owing to the capillary action of the pores, notwithstanding that the relative space per unit volume was greater. Some five years ago Professor W. Boyd Dawkins took a sample of chalk from the Whitewebbs well of the New River Company, and weighed it next day, during which interval some of the water must have evaporated. He weighed it again after 114 days, in which time it had lost 2·542 gallons of water per cubic foot of chalk, or 0·398 of its bulk. This, as against a maximum of 0·352 for ordinary compact sandstone (such as the new red sandstone), gave the chalk an advantage in storage capacity of at least 13 per cent., and more possibly. With many specimens, 20 per cent. would be a better working figure. The above sample of chalk when rewetted took up 2·437 gallons of water per cubic foot, and would he (Mr. Wiseman) believed have taken up its initial content, had sufficient time been allowed (the air admitted in process of drying being difficult of expulsion from the smaller pores). However, these figures gave an average capacity of 2½ gallons of water per cubic foot of chalk, which figure the Professor applied to the 250 square miles of water-bearing upper chalk (200 feet average thickness) in the Lea Valley above Fieldes Weir, and obtained a figure for storage capacity of 3,484,750 million gallons of water. Taking an average percolation of 10 inches (which was actually exceeded) per annum over the whole 350 square miles of the Lea watershed, they had a storage capacity equal to a daily supply of 139 million gallons, or 0·0039 of the storage capacity previously calculated, from which it was evident the Commission pumping figures of 47 million and 56 million gallons a day (equivalent to an annual percolation of 3·42 inches and 4·03 inches respectively), seemed, from the previous consideration, to have a large margin of safety. The argument involving a ratio of the water at present pumped to the calculated storage capacity of the strata did not seem exactly fair, as this figure was practically a fraction of the pumping capacity; and if the pumping-stations were sufficiently duplicated, so that the cones of depletion did not intersect, the ratio of pumping to rock storage could be considerably increased. In the average case, the radius of the cone was about a quarter of a mile; but where the strata were fractured, it might have a maximum extent of a mile, and thus a chain of stations 2 miles apart along selected lines would give the maximum efficiency.

Mr. T. Hennell (London) appeared aggrieved that Lord Balfour's Commission did not, apparently, pay much heed to a scheme which he submitted to them. Describing his proposal, he said the water of the Thames when it came down in flood ran at the rate of 10,000 million gallons a day; and Mr. Hunter's pumps could only deal with a mere fraction of that. By a different system, the water could be brought into reservoirs by gravitation. The whole 300 millions, if not 400 millions, could be taken at times when the flow of the river was considerably above the average; and therefore no depletion of the river would take place. The water would be taken into store at various points, and would be returned out of store into the river itself to equalize the flow, and so go down by the river to Hampton. It was obvious that water taken in without pumping was less expensive than water taken in by that means, and the cost of an embankment across a valley must be less expensive than a bank which had to be built all round it. His estimate of the cost of the scheme worked out at about £150 per million gallons; and it could be undertaken in instalments. To carry out the works, the eight Companies would have to combine. The Staines scheme he regarded as both important and valuable; but further reservoirs should be constructed above Oxford—nearer the source of the main river or its tributaries, so as to equalize the flow of the river. He thought the proper authorities to do this were the Conservators, whose duty it was to purify the river. The purification and storage ought, in his opinion, to go together. Then the water should be delivered by the Conservators to the Companies for distribution; or, better still, the future Water Board should be the Conservators.

Mr. C. C. Hutchinson pointed out that, although the estimates which Mr. Middleton had given might to some extent be excessive, yet, having regard to the problem that had to be solved (as the greater included the less), the sources which were adequate to supply London under those estimates would, of course, supply a smaller population equally as well as a larger one. He was not at all disposed to admit that, because there was a large amount of water in a distant district sparsely populated, they should take the water from where Nature had placed it, and bring it to a different part. No man could predict what changes were going to be wrought in the hydrological conditions of the district when they took such large quantities of water from it as was proposed by the Welsh scheme. His subsequent remarks showed that he sided with the author in regard to the sufficiency of the Thames both in respect of quality and quantity; and some observations upon the beneficial influence on water of storage carried the speaker to remark upon the great degree of care that was necessary to safeguard a water-bearing area from pollution.

Mr. MIDDLETON opened his reply on the protracted discussion with words of thanks for the kind manner in which his paper had been received. He found no fault with Professor Robinson or Mr. Hennell for advocating what they believed to be a superior system of storing the waters of the Thames; and he went so far as to say that he could conceive conditions in which it might be desirable to supplement the system which had already been adopted in the Thames Valley by a system of storage by gravitation alone. Mr. Hennell had himself pointed out one weak spot in the system—viz., that the storage reservoirs must be far removed from Hampton. Therefore some system of immediate storage at, or near, Hampton must be adopted; and this must precede the other storage. To prevent misapprehension, he corrected some of Professor Robinson's figures. The actual cost of the storage at Staines was not £380 per million gallons, but £184; and if another set of reservoirs of like character were constructed, the cost would be £155 per million gallons. If the reservoirs were of different shape and of greater area and larger capacity, they might be constructed as low as £100. Professor Robinson also said that in the paper it was stated that if, in the year 1931, 415 million gallons were required, it would involve a storage of 45,000 million gallons. He (Mr. Middleton) had not said anything of the kind. Supposing the supply were 415 million gallons, the amount drawn *from the Thames* would be only 271 million gallons, and the storage would be only 30,000 million gallons. Professor Robinson had not said where he proposed to make his storage reservoirs; but he (the speaker) naturally presumed they were the reservoirs the consideration of which was gone into before Lord Llandaff's Commission, and that they were therefore situated on the River Kennet. The area of that drainage was 350 square miles, or about one-tenth of the area of the Thames down to Hampton. It was pretty clear therefore that the area could not supply 700 million gallons of water per day. Mr. Hennell had stated that the maximum flow of the Thames in any one day was 10,000 million gallons; but the maximum was 20,000 millions, and the average maximum 6000 millions. He (the speaker) thought there would be a considerable depletion of the river under Mr. Hennell's scheme. It did not necessarily follow that making a dam across a natural valley would be cheaper than one carried all round. Like several of the speakers, he did not consider the population would increase so rapidly as was mentioned in the paper; but the Royal Commission, after a very careful consideration of the whole of the facts, accepted the figures, and therefore he (Mr. Middleton) had adopted them. He said distinctly that the idea that London would ever number 18½ millions, let alone 30 millions, was exceedingly improbable; and if this was true, his point was enormously strengthened. If the population mentioned was never arrived at, there would no be necessity for going to Wales at all. Professor Vernon Harcourt said it was wise to look ahead, and land in Wales should be bought now. If anyone liked to go into speculation of that kind, he (Mr. Middleton) did not see why he should not do so; but he did not see why the ratepayers should pay for it. As to Mr. Cowper Coles's remarks regarding the rainfall in Wales, he (Mr. Middleton) put the run-off of the Welsh drainage area at 40 inches, and the rainfall at 55 inches; but he thought that the former figure was rather too high, because in the Elan Valley scheme 30 inches of rain was given as all that was available. For a supply of 415 million gallons by the Welsh scheme, Mr. Hassard said the cost would be £38,300,000; but he had forgotten there were a good many other items that would have to go into the account. Nothing was put down for interest during construction, which would amount to about £10,000,000; and nothing was put down for connecting the supply with the service reservoirs all over London, which would cost at least another £6,000,000, and bring the total up to £54,000,000, which, in his judgment, was still too low. Taking as an analogy the Liverpool, Birmingham, and Manchester supplies, the cost of storage in Wales, calculating all charges for interest and sinking fund, was as 2·8 was to 1 as regards the Thames. Colonel Rathbone estimated the Welsh scheme would cost 2·3 times that of the Thames. Mr. Ashton Hill had referred to wells sunk in the sandstone, which were entirely different to wells sunk in the chalk. They had already fifty pumping-stations in the Thames and Lea Valleys, producing 90 million gallons per day for three months together; and if this number of pumping-stations were multiplied by four, they would have the number referred to by him in the paper. He did not see any reason why, over a large area, they could not do it with 200 pumping-stations.

Other matters of perhaps less importance than those noted were also dealt with by Mr. Middleton; but the claims on our space preclude a more extended report.

Midland Association of Gas Managers.—As already announced, the annual general meeting of the Association will be held next Thursday at the Grand Hotel, Birmingham. The *agenda* promises matter which is certain to be of considerable interest. There will be the Inaugural Address of the new President, Mr. T. Glover, of West Bromwich, who very rarely fails in original idea when he puts his pen to paper on professional topics. Following the address will come a paper by Mr. T. Berridge, of Leamington, who has succeeded in finding a theme for consideration outside the ordinary run of subjects dealt with in Association papers. His contribution is on "The Training of a Gas Engineer;" and, in view of the kindred questions recently dealt with in these columns, we look forward to the discussion with pleasure.

REGISTER OF PATENTS.

Gas-Engine Governor.—Rowden, W. T., of Lenzie, N.B. No. 2303; Feb. 6, 1900.

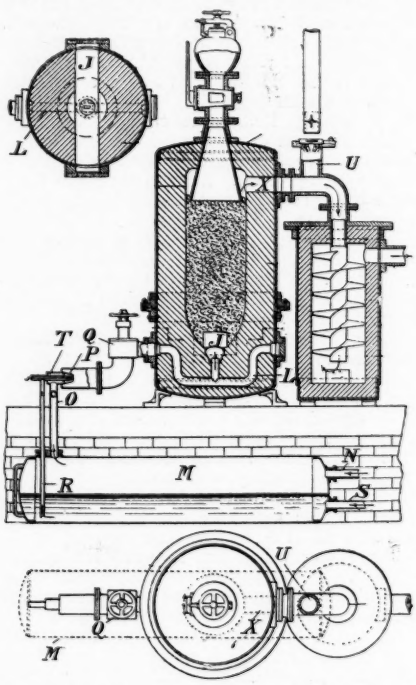
The methods usually employed for controlling the speed of gas-motors are: Firstly, the hit-and-miss arrangement, whereby the supply of combustible material is altogether cut off during one or more cycles, when the motor's speed exceeds a fixed limit; secondly, various methods of restricting the quantity of combustible material supplied for each charge, with or without the simultaneous restriction of the quantity of air for burning it. The present invention includes the use of both these methods.

In the first place, any increase of velocity of the motor is checked by the action of an ordinary ball-governor on a valve for throttling the gas supply. Then, after the power of the engine has been reduced in this manner to about 60 or 70 per cent. of its full power (or to any other percentage that surrounding conditions render possible or advisable), any further increase of speed causes the same governor to throw into gear the two edges of the hit-and-miss type. One of these edges is always receiving a reciprocating motion from some part of the motor mechanism; but the other is at rest when not engaged. When, however, the increased action of the governor has put the two edges into gear, the latter throws out of action a hinged piece that conveys motion from the gas-cam to the spindle of the gas-valve, and thereby completely cuts off the already throttled gas supply.

Gas-Generator.—Leroy, P., of Paris. No. 2709; Feb. 10, 1900.

This gas-generator "operates continuously, and under pressure, and permits of the generation of all kinds of gas, whether for heating or illuminating purposes, and more particularly of poor gases—such as air gas, mixed gases, or water gas."

It consists essentially in the employment, as the agent of combustion, of compressed air "admitted at any suitable pressure, and which causes active and complete combustion, so that gases are obtained of high calorific power and of regular composition." Furthermore, "the production of the gas being effected under pressure, a considerable rise in temperature takes place; and this assists the separation of certain bodies—such as tar, ammonia, &c.—which would tend to be formed."



As shown, the generator comprises a shell in two parts, united by the straps. In the interior is arranged a mass of refractory material leaving in the centre the requisite space to receive the combustible material. This space is of "cylindro-paraboloid" form, so as to ensure an equal distribution of the air through the mass of combustible material, and consequently regularity of combustion as well as of production and composition of the gases. Above the generator is a connection or tube supporting the measuring-cock, through which the combustible material is introduced in proportion as it is required from a receiver above. A passage J made in the refractory material below serves to allow the removal of the slag and cinders produced. This opens into a pipe forming a short connection from the pipe L, through which the air under pressure is introduced. This pipe L passes through the gas-generator from side to side, so as to allow the air to enter, from either side, and thus prevent the melting of the pipes. The compressed air entering at a pressure varying according to the nature of the gas to be produced, is distributed by a fan or the like into the vessel M through the tube N, then through the pipe O and the injector P into the cock Q, whence it passes into the pipe L.

Another pipe R serves for feeding the water if mixed gas or water gas is to be manufactured. The water is supplied by means of a pump or the like through the tube S, and is distributed in the form of spray through the needle-injector T. U is the ignition-flue closed by a cover, which at the moment that the ignition is to be effected is turned on its hinge so as to introduce the pipe above it.

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BLOWPIPES.
FOOT-BLOWERS.
TINMAN'S BOLT HEATERS.
LEAD POTS FOR PETROLEUM OIL.
BRAZING FORGES.
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At this side is an extension of the outlet-aperture X, directing the gas into a cleaner having an archimedean screw fitted to it. The gas under pressure enters the washer through the lower part, passes around the worm of the screw, and is thereby freed from its impurities, and finally is directed through the outlet to the place where it is to be used.

The apparatus being charged with combustible material and the lighting having been effected, the flue U is shut, as well as all the openings, so that the generator is hermetically closed. The compressed air-inlet passage is then opened (and subsequently the water-passage, if mixed gas is to be made). The air being introduced at the required pressure, enters the gas-generator as already explained, and reaches the mass of fuel, developing a very high temperature, and causing "an active combustion and consequently rapid production of gas under the best conditions." The gas obtained is then directed under pressure into the cleaner, whence it is finally sent (always under the same pressure) to the place where it is to be used.

When working the apparatus with raw petroleum or heavy oils, the oil placed in a small adjoining vessel is put in communication with the generator above the layer of cinders formed during the working. Its delivery, like that of the water, is regulated by an injector operated by compressed air. "The introduction of the petroleum and heavy oils never takes place alone, it is always effected in presence of incandescent coal; its only object being to enrich the gas in non-condensable gaseous hydrocarburets and in oxide of carbon."

Lighting Street-Lamps.—Taig, J., B. T., & R., and Robertson, J., of Alexandria, N.B. No. 3555; Feb. 23, 1900.

This invention relates to means for lighting street and other gas-lamps, and more especially such as are fitted with incandescent burners and mantles—without inserting a lighting-pole within the glass globe or lantern, and thereby exposing the mantle to risk of damage by the rod and by air-currents entering through the orifice in the lamp. This lighting is effected by means of a strip of platinum or other electrical conductor placed in proximity to the burner, and heated to incandescence by transmitting through it the current from a battery or other electric generator carried by the lamplighter.

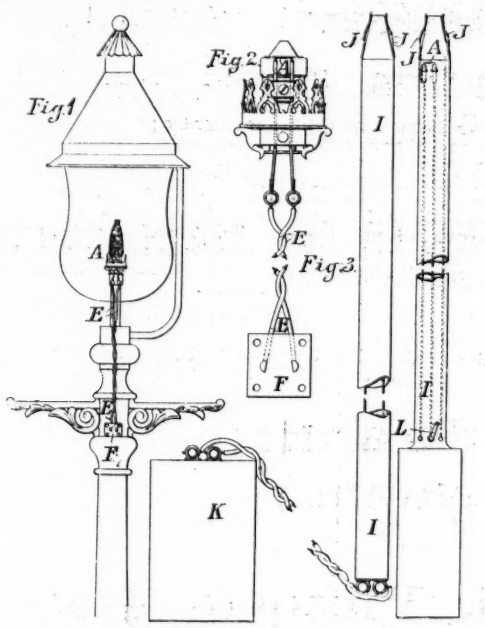


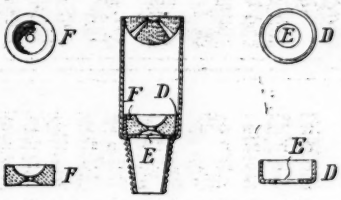
Fig. 1 is an elevation of a lamp-post showing the invention applied to it. Fig. 2 is a view of the burner and connections to the terminals (to a larger scale). Fig. 3 is a view of the battery and pole for making the circuit from the battery through the platinum or other conducting strip; also a modified form of lighting-pole applicable both for insertion between the terminals and within the glass globe of the lamp-post.

A platinum strip A is secured alongside the burner, in such a position as not to be exposed to overheating, and is connected by conductors, of which one may be an insulated wire and the other formed by the gas-pipe, or else of copper strips, between which the conducting wire is extended; the copper strips being secured to terminals from which insulated wires E extend to terminals on a block F or hood fixed at any convenient part of the lamp-post. The lamplighter's pole I has fitted at its upper end springs or terminals J, which are connected by conductors to positive and negative terminals of a battery K by conducting wires H. When the lamplighter, by inserting the upper end of his pole between the terminals on the block F, makes contact with the terminals, current is transmitted through the platinum strip A, which is thereby raised to incandescence, and lights the gas, which has previously been turned on in the usual way.

When ordinary burners without mantles are in use, the modified lighting-pole may be employed. Here the strip of platinum A (instead of being secured alongside the burners) is carried near the upper end of the pole, and, being raised to incandescence as required by operating a switch L on a plate to which the wires from the platinum strip are connected, transmits through it the current from the battery in the lower end of the pole or attached thereto. The pole is made with terminals J at its upper end, for insertion between the terminals in the hood or block on the lamp-post; but it is furnished with three or more conductors, and the switch L is provided by means of which the current may be transmitted either through the terminals to the platinum strip A on the burner, when lighting a lamp furnished with an incandescent burner and mantle, or through a platinum strip A connecting two of the conductors at the upper end of the pole for lighting a lamp provided with an ordinary burner.

Gas-Burners.—Bray, G., of Leeds. No. 6361; April 5, 1900.

The claim for this invention is the combination with the burner-socket (threaded to engage with a gas-fitting, and the opposite end provided with a tip) of a diminisher F placed within a cup D of yielding material, applied within the socket. The object of the patentee is to secure the diminisher within the burner-socket in such a manner that a gas-tight joint is made between the diminisher and socket, and to so form the joint that, on nipping the exterior of the socket, the liability of damaging the diminisher is reduced, and the gas-tight joint preserved, should the contour of the socket be to some extent disturbed on screwing the burner into or out of the gas-fitting.

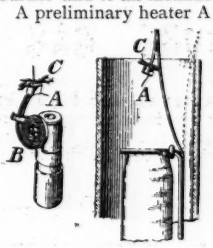


The cup D is formed of yielding material—such as, for example, cardboard. It has a hole E through the base of suitable diameter, so as not to interfere with the passage of the gas; and into the cup is placed a diminisher F of ordinary shape. These are pressed into the interior of the socket—the cardboard cup supporting the diminisher, and thus forming a gas-tight joint around it.

Devices for Causing the Ignition of Illuminating Gases.—Thompson, W. P.; a communication by Dr. Angelo Simonini, of Brooklyn, New York. No. 7596; April 24, 1900.

The illustrations show the suggested device applied to an open gas-burner and to an incandescent mantle support.

A preliminary heater A is employed, comprising, in the main, a body of platinum-black made up in the form of a pill or pellet, and carried by a support mounted on a thermostatic coil B. In connection with the preliminary heater, there is employed what is termed an "igniter," and also a third body or substance, termed, for the purpose of description, an "intermediate heater." The pellet A serves to absorb or condense a certain amount of oxygen or gas, and is thereby caused to glow; and the heat thus generated is transferred from it to the intermediate heater, and from this again to the igniter proper. Under certain conditions, and with some qualities of gas, the intermediate heater acts as an igniter; but for general use, where the conditions and quality of the gas cannot be definitely known, it is said to be best to employ the three parts in conjunction. The igniter and intermediate heater are not, generally, of themselves, capable of absorbing, in the first instance, the gases or oxygen, and causing ignition; but after having been preliminarily heated by the heat derived or absorbed from the glowing pellet, the parts do become active.



Heretofore (see "JOURNAL," Vol. LXXVI., pp. 31, 1400) the patentee has proposed to employ an igniter made out of suitable webbing in the form of strands or threads impregnated with a solution of nitrate of cerium, or didymium, or praseodymium, or neodymium, or with a mixture of thorium nitrate with one or more of the nitrates named, with or without a very small percentage of ruthenium. A very effective preparation consists of 92 per cent. of thorium nitrate, 4 per cent. of neodymium, and 4 per cent. of cerium nitrate in (say) 1 litre of water to 1 kilogram of salt compound. Ruthenium, if used, should not exceed 0·2 of 1 per cent.; and it is preferred that it shall be as low as 0·1. Ruthenium is found when used in this small quantity to hasten the lighting action. The webbing or threads thus impregnated are incinerated before being used; and consequently the nitrates are transformed into oxides.

In the present instance, this is used as the intermediate heater C. The combination of rare earths thus brought about is different from that which goes to make up an ordinary incandescent mantle. In fact, the better the self-lighter obtained by the combination of rare earths, the less suitable is it for making up an incandescent mantle. This is said to have been found to be a fact from actual use, and is "here stated for the purpose of distinguishing the present invention from that class of self-lighting mantles wherein the mantle itself forms a part of the igniter."

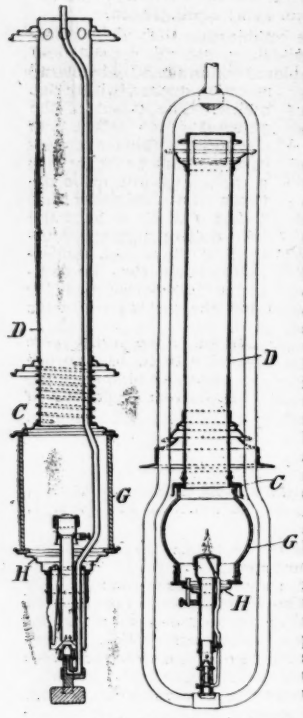
The third part of the present lighter is composed of a platinum wire or oxides of metals—such as thorium oxide, zirconium oxide, and lanthanum oxide, preferably (but not necessarily) mixed with about 1 per cent. of cerium oxide, which produce, by their catalytic action, a high degree of temperature, sufficient to ignite the gas or vapour coming in contact with them. Or the igniter may be composed of a wire of the platinum group, in combination with one or more of the oxides of the rare earths. The rare earths are prefefably (but not necessarily) supported by platinum wire; and cotton webbings or threads are impregnated with the solution of rare earths.

Air-Cooler for Gas-Engine Cylinders.—Rea, S. W., of Rushville, U.S.A. No. 15,869; Sept. 6, 1900.

In order to overcome the heating of gas-engine combustion chambers—more especially the head portions—the patentee proposes to employ (instead of the usual water-jacket) means for keeping up a circulation of cool air around the cylinder, by utilizing the exhaust from the engine to pump air into the enclosing jacket at one side, and expel it out at the opposite side, so as to provide a continuous current of air around the cylinder during the operation of the engine, more especially when it is of the portable type, or when used in the propulsion of vehicles.

Incandescent Gas-Lamps.—Dymond, G. C. ; a communication from S. Zielenziger, of Berlin. No. 14,552; Aug. 14, 1900.

This improvement in incandescent gas-lamps is designed "to raise the illuminating power of the incandescent mantle to the highest degree by the use of means of greatest simplicity." This effect is obtained by increasing the supply of atmospheric air to the gas before ignition by utilizing the lamp chimney, which, "in combination with the suitably-dimensioned constituent parts of the lamp, exerts a strong suctional force."



In the two modifications of construction shown, the upper portion of the burner A is within a cylindrical or globular body G of glass or other translucent material. The top of the cylinder is formed by a sheet metal cover C made with a central aperture by which it can slide on the lower end of the chimney D. The lower end of G is carried by a bottom H, similar to the cover C, so as to prevent the entrance of air into the lower end of the cylinder. By making the burner fit almost tightly into the lower end of the chimney, the full suctional force of the latter will be utilized to draw air into the burner, and so increase the volume of air mixing with the gas within the burner, and increase the heat of combustion And it will be further seen that the amount of air drawn into the burner by the suctional force of the chimney will depend on the length of the chimney, and also of the area of the apertures of the burner-top from which the mixture of gas and air issues. In practice, the totality of the area of such apertures should be about double that of incandescent burners of the usual kind ; and in employing a burner of such area, the height of the chimney required will need to be about 25 inches above the burner-top

Igniting Gas.—Deimel, F., of Berlin. No. 18,499; Oct. 17, 1900.

This automatic gas-igniting device consists of a small moveable plate, placed outside the glass cylinder of the lamp, and directing the mixture of gas and air continuously towards the lighting primer, when the moveable plate is inclined downwards. If, however, the plate is inclined upwards, the products of combustion are led in the opposite direction of the primer—thus preventing it from being touched by the products of combustion.

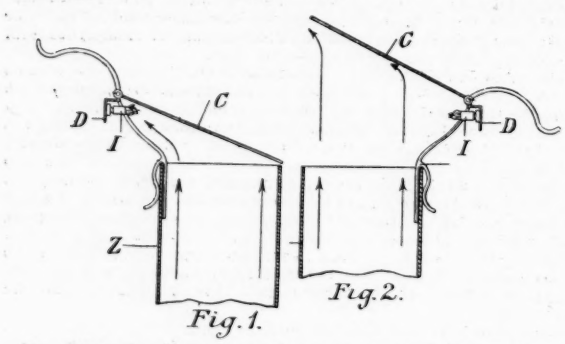


Fig. 1 illustrates the device in a position in which the gas is not lit. Fig. 2 shows it after the gas is lit.

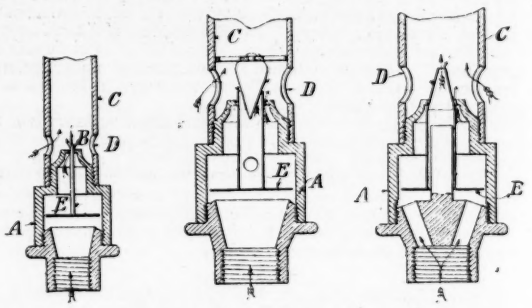
As soon as the gas-cock is turned on, the mixture of gas and air passes into the glass cylinder Z, and pushes the downwardly-inclined plate C along to the higher-situated primer I. Here the mixture of gas and air is caught by the point D, which, lying behind the primer, serves to make the platinum-wire of the primer red hot, so as to light the gas. The plate is then raised by the pressure of the hot air-current into the position shown in fig. 2 ; and "the hot destructive products of combustion cease now to impinge upon the lower-situated primer, and go along the upward-directed plate C outside into the open air."

Gas-Burner Regulators.—Bablon, I. N. V., of Paris. No. 21,066; Nov. 21, 1900.

The object of this invention is the combination of a discharge-regulator with any kind of injecting device, but more particularly with the bunsen injector of incandescent gas-burners. This combination consists in causing the obturating or closing part of a regulator to act upon the injecting orifice or orifices—that is, using the orifice or outlet of variable section of a regulator as the injecting-orifice. By this means, two distinct devices hitherto used (the regulator and the injector) are combined in one apparatus.

Three forms of the regulating injector are shown. In fig. 1, the box or chamber A is provided at its upper end with a central orifice B, through which a jet of gas passes into the mixing tube or chamber C, drawing in air through the lateral openings D. Into the orifice B is introduced the conical point of a rod or pin, which is caused by the piston-E to move upwards and close the free section of the orifice in the same degree as the pressure of gas under the piston causes the latter to rise. Consequently, the discharge remains uniform in spite of the variations in the gas pressure.

This arrangement constitutes the principle of the regulating injector of this invention. Hitherto (the patentee remarks), when it was desired to provide an incandescent gas-burner with a regulator, the injector of the burner, a device already complete in itself, was simply placed over a regulator, another device complete in itself. The present invention, on the contrary, represents an essentially single and indivisible whole, owing to the fact that the orifice B forms an integral part both of the injector and of the regulator.

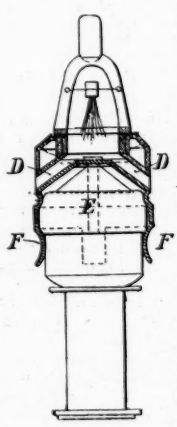


In all former arrangements in which the injector and the regulator are distinct interposed devices, there are two different orifices : At one place the outlet with variable diameter of the regulator ; at another place the orifice with fixed diameter of the injector. In the present device, on the contrary, there is only one orifice, which is at the same time the injecting and the discharge-regulating orifice, owing to the action of the valve modifying its section.

In addition to the advantage of simplifying the construction as compared with the old method of superposing the regulator and injector, this regulating injector is said to produce "a new physical effect which characterizes it, and from which an advantage may be drawn hitherto not realized in the action of incandescent gas-burners." The illuminating capacity of an incandescent gas-burner is susceptible of augmentation, other conditions being equal, in the same measure as the speed of the passage of the gas through the injecting orifice or orifices is augmented. An ordinary regulator placed above an injector, only maintains below the outlet of the latter the pressure necessary for the discharge of the volume of gas for which the regulator is adjusted. In the arrangement here briefly described, it is, on the contrary, the section of the injecting orifice B itself which is diminished in the same degree as the pressure of gas increases ; and from this fact an increase results in the speed of the gas on leaving the orifice, and consequently an increase in illuminating capacity. Therefore, while, owing to the construction, the illuminating capacity is already good with low pressure, it will improve in the same degree as the pressure increases.

Incandescent Gas-Burners.—Scheele, T. A., of Berlin. No. 19,267; Oct. 27, 1900.

This invention relates to a removable burner-device provided with an automatic igniter and suitably arranged air-admission conduits—the device consisting of a supporting pin and spring sides, which render it possible to attach it to incandescent burners of ordinary construction.



As shown, it consists essentially of a sheet-metal cylinder, provided at its upper end with a second cylinder concentrically arranged, and containing two air-conduits D. The level of the edge of the upper cylinder is slightly raised above that of the lower one ; and a connection between the two is formed by a perforated ring standing in a slanting direction. The inner cylinder carries a downward projecting pin E, which serves, in combination with springs F, on the lower cylinder, to secure the apparatus to the burner. Above the upper cylinder is arranged an arched device, carrying an ignition ball or threads ; and on the top of the arch is a common mantle-fork or support.

When adjusting the device on an ordinary incandescent burner, the guiding-pin is inserted into the recess which usually is intended to hold the fork for the mantle. The springs F press closely against the casing ; and the contraction above renders any escape of gas downwards impossible. In consequence of the slanting arrangement of the ring, "ignition is effected without shock and disturbance—an effect which is readily explained, if it is remembered that, owing to this arrangement, the gas current is obliged to follow a direction which is best for the purpose in view, and in consequence of which the most advantageous mixture of the gas and air arriving through the conduits D is obtained."

The patentee claims that his invention differs from others, in that "it offers the possibility of changing an incandescent burner, without the need of special arrangements, into an automatically igniting burner." At the same time, attention is called to the advantage offered to the slanting arrangement of the ring, instead of it being horizontal, and "consequently unable to produce the same favourable conditions required for the process of self-ignition."

Incandescent Gas-Burners.—Carpenter, C. C., of Old Kent Road, S.E. No. 22,491 ; Dec. 10, 1900.

This invention relates to means for preventing the damage to mantles frequently occasioned—"when the burners employed for incandescent gas lighting are such as to cause a perfect and properly proportioned mixture of gas and air to be supplied at the point of ignition"—by the

shock of the momentary explosion which takes place when the flame is lighted or extinguished.

For this purpose, the patentee proposes to arrange the burner and its stopcock so that there is supplied to the mixing-chamber of the burner immediately before lighting or extinguishing an excess of gas over that used normally by the burner; "so that the percentage volume of air supplied thereto is considerably reduced, and the burner is lighted or extinguished with a lessened explosive effect." This may be conveniently carried out by means of a two-way cock, the plug of which is so arranged that in a certain position gas passes through both ways. One of these ways supplies the nozzle of the burner, and the other a jet or jets leading to the mixing-chamber. When, however, a current of gas is passed through both, the inflow of air to the mixing-chamber is retarded, and the explosive effect of the mixture of gas and air is reduced.

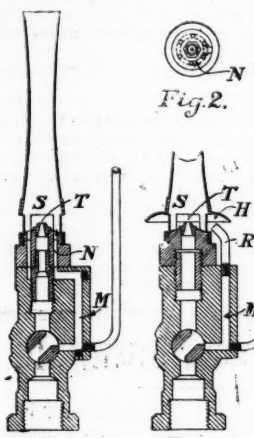


Fig. 1.

Fig. 2.

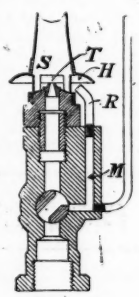


Fig. 3.

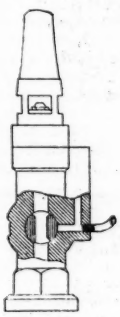


Fig. 4.

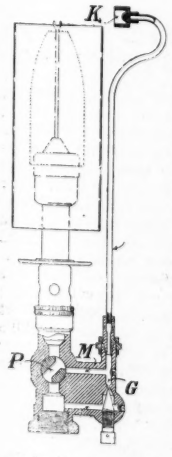
Fig. 1 is a sectional elevation of such a burner; and fig. 2 is a plan view of the top. Fig. 3 is a sectional elevation showing a slight modification. Fig. 4 shows the cock in a different position.

The barrel of the cock has through it a way so constructed that, when the plug is in the position shown in fig. 1, gas not only passes to the nozzle T of the burner, but also through the secondary gas-passage M, and thence through a series of holes drilled through the burner from an annular groove N. When ignition of the gas has been attained, a further movement of the plug (as shown in fig. 4) shuts off entirely the secondary gas supply, and allows the gas to pass in the usual manner and quantity through the nozzle T. The process is reversed during the operation of moving back the plug of the cock in order to extinguish the flame.

Instead of passing the secondary gas supply through the jets, it may be led by a single tube into the mixing-chamber S of the burner. Or the secondary gas supply may be led by a tube R (fig. 3) near to the mixing-chamber S of the burner, in which case a hood H is provided in order to direct the gas and air to the mixing-chamber as before. This secondary gas supply to the burner may be employed in conjunction with such a secondary supply of gas used for igniting the burner, as is described in patent No. 20,341 of 1900.

Igniting Incandescent Gas-Burners.—Carpenter, C. C., of Old Kent Road, S.E. No. 23,027; Dec. 17, 1900.

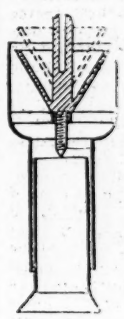
This is a modification of patent No. 20,341 of 1900 (*see ante*, pp. 147-48), in which the ignition of incandescent types of burners by means of a secondary gas supply ignited from a continuously burning pilot-light was provided for. In the previous invention, a secondary gas supply was led by a separate pipe to a jet arranged in juxtaposition to the pilot-light, so that when a secondary current of gas was allowed to flow through the pipe, it was ignited on issuing from the nozzle by the pilot-light; and the flame, being thrown across the top of the mantle, was in a position to ignite the combustible mixture issuing from the burner. The patentee finds, however, that the secondary gas supply may be led into the same pipe which supplies the pilot-light—the additional flow of gas being sufficient to so lengthen the pilot-light (which for this purpose may be placed horizontally) as to bring it into position to ignite the gas issuing from the burner.



The plug of the burner-cock has a way P so constructed that, when it is moved to the horizontal position, gas cannot pass either to the burner or the secondary gas supply. When, however, it is moved to the vertical position, gas only passes to the burner; but when it is placed in the position shown, gas passes simultaneously to the burner and to the secondary gas supply M. The pilot-light K is supplied with gas taken from below the plug of the cock through the regulating-orifice G; and the amount of gas allowed to pass it can be such that the pilot-light would not ignite gas flowing from the burner. If, however, by reason of the plug of the cock being placed in the position shown, a secondary supply of gas is allowed to flow through the passage M into the pipe supplying the pilot-light, the pilot-flame would be lengthened so as to ignite the gas passing through the burner. When the plug of the cock is further moved to the vertical position, the secondary gas supply is shut off and the pilot-flame is diminished to its normal length, as adjusted by the device G

Incandescent Gas-Burners.—Thompson, W. P.; a communication from B. Jolles and Zietz and Bruno, of Berlin. No. 21,890; Dec. 3, 1900.

This invention relates to incandescent gas-burners of the class in which the top of the burner is not, as usual, covered by a sieve of metallic wire, or a perforated or slotted plate of such kind, but the current of gas and air mixed in the burner-tube is made to issue from an open circular slit at or near the inside surface of the burner-top. Burners for incandescent gas-lights, in which the mixture of gas and air issues from a circular slit, are well known; but the present invention consists in the particular means of providing, within a burner of the usual kind, a circular slit for the issue of gas and air, in such a manner as to avoid (as much as may be practically obtained) a separation of the molecules of gas and air on their way up to the point of combustion above the burner-top. It is (say the patentees) a fact proved by experience, that the mixture of gas and air subjected to combustion in an incandescent burner considerably loses in its heating power if the rising current of mixture encounters in its way obstacles which are apt to divide the current, and which "by way of their resistance impair the homogeneousness of the state of mixture of the gas and air, which had been formed within the burner-tube."



According to this invention, within the open top of the burner there is placed—as shown—an inverted conical body, with its base turned upwards; and between the base and the inside surface of the burner-top a circular slit is formed, through which the current of gas and air can issue in a condition of mixture.

APPLICATIONS FOR LETTERS PATENT.

1865.—Binns, J. P. & J. O., "Gas and oil engines." Jan. 28.
1869.—Goldstraw, E. M., "Cleaning incandescent gas-burners." Jan. 28.
1918.—Laughlin, A., "Gas-producers." Jan. 28.
1933.—Watkinson, J. G., "Gas-burners." Jan. 28.
1951.—Hollings, L. S., "Gas and similar engines." Jan. 29.
1977.—Lancaster, E. W., "Acetylene generators." Jan. 29.
2005.—Thompson, W. P., "Strengthening incandescent bodies for gas lighting." A communication from A. Wasmuth. Jan. 29.
2020.—Gobbe, E., "Utilization of the heat of coke removed from retorts." Jan. 29.
2040.—Mucke, F., and The Deutsche Continental Gas Gesellschaft, "Fittings for lamps." Jan. 29.
2060.—Jefcoate, H. J., "A support for gas-shades." Jan. 30.
2086.—Hatcher, F., "Gas and oil stoves." Jan. 30.
2101.—Goetschke, P., "Incandescence materials for gas lighting." Jan. 30.
2115.—Lavé, J., "Combined gas and steam engine." Jan. 30.
2117.—Abel, C. D., "Ignitors for internal combustion engines." A communication from The Gasmotoren Fabrik Deutz. Jan. 30.
2147.—Ross, J. H., "Gas-burner." Jan. 31.
2160.—Naef, P., "Cooling and lubricating working parts of fluid pressure motors." Jan. 31.
2192.—Glover, R. T., "Dry gas-meters." Jan. 31.
2221.—Green, J. H. & W. H., "Acetylene generator." Feb. 1.
2225.—Crossley, W. J., and Atkinson, J., "Gas-producers." Feb. 1.
2250.—Hinckley, H., "Gas-burners." Feb. 1.
2261.—Lowen, W., "Burners for incandescent gas lighting." A communication from F. W. & C. Killing. Feb. 1.
2388.—Kaeferle, F., "Pressure reducing apparatus." Feb. 4.
2413.—Wright, G. E., and M'Neill, D. R., "Gas cooking-stoves." Feb. 5.
2442.—Southall, J., "Internal combustion engines." Feb. 5.
2467.—Hatfield, H. S., "Gas thermometers and pyrometers." Feb. 5.
2469.—Imray, O., "Enriching coal gas." A communication from J. R. M'Lean. Feb. 5.
2508.—Niemann, C., "Incandescent gas-lamps." Feb. 5.
2509.—Rudolph, A., "Air carburetting apparatus." Feb. 5.
2533.—Guest, C. H., "Carburetters." Feb. 6.
2580.—Paley, G., "Non-return valve." Feb. 6.
2620.—Adam, M. A., "Water-meters." Feb. 7.
2672.—Westwood, W. H., Wright, E. T., and Westwood, W. W. S., "Manufacture of coal and other gases." Feb. 7.
2691.—Lawtons Patents, Ltd., and Lawton, A. W., "Cooling gases." Feb. 7.
2709.—Blair, D. R., "Gas-heated irons." Feb. 8.
2750.—Kramers, J. C. H., and Aarts, J. G., "Manufacture of water gas and semi-water gas." Feb. 8.
2766.—Gosweiler, K., "Acetylene generator." Feb. 8.
2788.—Dodge, J. M., "Elevating and conveying apparatus." Feb. 8.
2801.—Parkinson and W. & B. Cowan, Ltd., and Cheshire, W., "Prepayment gas-meters." Feb. 9.
2803.—Meacock, T. & O. J., "Gas-engines." Feb. 9.
2807.—Hamilton, C. A., "Carburetting devices for internal combustion motors." Feb. 9.
2818.—Durozoi, M., "Water-meter." Feb. 9.
2820.—Boult, A. J., "Automatic gas-igniters." A communication from Chemisch Technische Industrie Gesellschaft mit beschränkter Haftung. Feb. 9.
2846.—Kemp-Welch, J. S., "Manufacture of water gas and producer gas." Feb. 9.
2856.—Biheller, S., "Burners for incandescent gas-lights." Feb. 9.

Louth Corporation and the Water-Works.—At a meeting of the Louth Town Council last Tuesday, the Highways Committee reported in favour of the purchase of the Louth Water-Works; and, while recommending that notice be given to the Company of the intention of the Council, they advised that a sum of £15,100 be offered for the undertaking. It was decided to discuss the question by a Committee of the entire Council.

CORRESPONDENCE.

[We are not responsible for opinions expressed by correspondents.]

The London Chamber of Commerce and the Electrolysis of Gas and Water Pipes.

SIR,—I beg to enclose copy of the circular referred to by Mr. George Livesey at the meeting of the South Metropolitan Gas Company on Wednesday.

This circular will show more fully than the reports of Mr. Livesey's speech what is the actual position so far as the Chamber is concerned. The circular was sent to promoters of Tramway and Light Railway Bills and Provisional Orders through the medium of the Electrical Trade Section of the Chamber; and it will be seen it merely supports regulations already laid down by the Board of Trade, after full discussion and inquiry, which it is desired shall be embodied in any regulation during the coming session. Such regulations were only arrived at by a Joint Committee of both Houses after hearing the fullest representations from the gas, water, and electrical interests.

The fact is that an attack is now being made upon the electrical industry by the Gas and Water Companies, and not *vice versâ* as suggested by Mr. Livesey—assuming, of course, that the reports of his speech are correct. So far from the Chamber being only willing to "take up the cudgels on behalf of one particular industry," it may be pointed out that if the Gas and Water Companies wished to utilize the machinery of the Chamber in the same way as its Electrical Section has done, similar facilities would be afforded to them, as the organization of the Chamber expressly provides for the furtherance of sectional interests when desired.

KENRIC B. MURRAY, Secretary,
London Chamber of Commerce.

Botolph House, Eastcheap, E.C., Feb. 15, 1901.

[ENCLOSURE.]

Earth Returns, &c.: Joint Committee Clause.

Dear Sir,—At the last meeting of the Electrical Trades Section of this Chamber, I was requested to write you with reference to the contemplated action of the Associated Gas and Water Companies in connection with what is known as the "Joint Committee Clause." You will remember probably that prior to 1893 the Telephone Companies were in the habit of opposing all Tramways Companies seeking electrical powers, with the object of obtaining a clause absolutely protecting the Telephone Companies' wires.

In many cases such a clause was given by promoters to avoid the great expense of fighting the Telephone Company; and, when the question was fought, Committees gave varying decisions

In 1893, a Joint Committee of the two Houses of Parliament was appointed to consider the whole question; and, by the terms of reference, the question of interference with gas and water pipes by electrolytic action, as well as that of interference with telephone wires, was referred to the Committee.

The report of this Committee is, no doubt, well known to you. As regards electrolytic action, the decision was contained in the following clause, which is now inserted in all Bills and Orders authorizing the construction of Tramways and Light Railways:—

47. *Motive Power.*—The carriages used on the railway may be moved by animal power or mechanical power, subject to the following provisions (that is to say): (*a*) No mechanical power shall be used except with the consent of and according to a system approved by the Board of Trade. (*b*) No animal power or steam locomotives shall be used except with the consent of the local authority and of the road authority; but that consent shall not be unreasonably withheld, and any question which arises as to whether such consent is unreasonably withheld shall be referred to arbitration under this Order.

49. *Special Provisions as to Use of Electric Power as a Motive Power.*—The following additional provisions shall apply to the use of electric power under this Order, unless such power is entirely contained in and carried along with the carriages (that is to say): (1) The Company shall employ either insulated returns or uninsulated metallic returns of low resistance. (2) The Company shall take all reasonable precautions in constructing placing, and maintaining their electric lines and circuits and other works of all descriptions and also in working the undertaking so as not injuriously to affect by fusion or electrolytic action any gas or water pipes or other metallic pipes, structures, or substances, or to interfere with the working of any wire, line, or apparatus used for the purpose of transmitting electric power, or of telegraphic, telephonic, or electric signalling communication or the currents in such wire, line, or apparatus. (3) The electric power shall be used only in accordance with the Board of Trade general or special regulations; and in such regulations provision shall be made by the Board of Trade special regulations for preventing fusion or injurious electrolytic action of or on gas or water pipes or other metallic pipes, structures, or substances, and for minimizing, as far as is reasonably practicable, injurious interference with the electric wires, lines, and apparatus of other parties, and the currents therein, whether such lines do or do not use the earth as a return. (4) The Company shall be deemed to take all reasonable precautions against interference with the working of any wire, line, or apparatus if and so long as they adopt and employ at the option of the Company either such insulated returns or such uninsulated metallic returns of low resistance, and such other means of preventing injurious interference with the electric wires, lines, and apparatus of other parties, and the currents therein, as may be prescribed by the Board of Trade special regulations; and, in prescribing such means, the Board shall have regard to the expense involved, and to the effect thereof upon the commercial prospects of the undertaking. (5) At the expiration of two years from the commencement of this Order, the provisions of this section shall not operate to give any right of action in respect of injurious interference with any electric wire, line, or apparatus, or the currents therein, unless in the construction, erection, maintaining, and working of such wire, line, and apparatus all reasonable precautions—including the use of an insulated return—have been taken to prevent injurious interference therewith, and with the currents therein by or from other electric currents. (6) If any question arises between the Company and any other party with respect to anything hereinbefore in this section contained, that question shall be referred to arbitration under this Order. (7) In this section, the expression "the Company" includes any company or person owning, working, or running carriages on the railway or on any portion thereof.

The Gas and Water Companies are now endeavouring to get the various authorities to depart from this clause, and to have the following clause inserted:—

(*Extract from the Wrexham Tramways Bill.*)

Notwithstanding anything contained in the Wrexham District Tramways Act, 1873, or the Wrexham District Tramways Order, 1899, the promoters shall be liable for any loss or damage to the water mains or pipes of the Wrexham Water-Works Company resulting from fusion or electrolytic action caused by any currents generated or used for the purposes of electric traction on any of the tramways authorized by the said Act or Order.

The prejudicial effect of this, and its far reaching consequences upon the electrical traction industry, will be seen at once.

It is most desirable that no promoters should give way upon the point, or agree to any modification of the Joint Committee clause; and arrangements are being made to fight a test-case during the ensuing session in the general interests of the electrical industry.

The Electrical Trades Section of this Chamber is prepared to give advice and assistance to all interested in the question; and I shall be glad to hear that you agree with the views of the Section, and will co-operate with it in effecting its object.

(Signed) KENRIC B. MURRAY, Secretary.

The Use of Oxide and Lime in Gas Purification.—Mr. B. W. Smith, Engineer and Manager of the Borough of Walsall Gas-Works, asks us to intimate that, in view of the fact that he is preparing a paper on "Purification and the Various Methods of Working Purifiers," to be read at the meeting of the Institution of Gas Engineers in May, he will be much obliged by any engineers or managers of gas-works throughout the country who have not already done so, sending him the following information: (1) The quantity of oxide used per annum; (2) the amount of spent oxide produced; (3) whether oxide is used before or after lime; or (4) whether oxide or lime only is employed.

LEGAL INTELLIGENCE.

Damage to Mains by a Traction-Engine.

At the Oldham County Court, before his Honour Judge Bradbury a few days ago, the Oldham Corporation sued George Holt, a carrier, of Rochdale, for damage amounting to £4 15s. 9d. caused by his traction-engine breaking gas and water mains in the Shaw and Lees district. Mr. Hallsworth, Assistant Town Clerk, appeared for the Corporation; Mr. Fripp represented the defendant Mr. Hallsworth said the defendant disputed liability in the absence of proof of negligence. In the case of the damage done in the Shaw district, there was, in his opinion, a considerable amount of negligence in allowing the traction-engine to stand; but in the other case, at Lees, he was not prepared to prove absolute negligence. The mains were laid at a depth of 2 ft. 6 in., which he thought was quite sufficient to resist all ordinary traffic, but not this engine and the load it was drawing. At common law, the liability of the defendant was clear, on the ground that a traction-engine is a nuisance and a thing which is liable to cause injury to the property of other people. The damage done was not disputed. His Honour said he took it, and Mr. Fripp concurred, that the defendant was perfectly entitled to use the road. As the amount of damage was not disputed, it was now a question of law and fact. The engine was there when the damage was done, but there was a doubt as to whether it caused the damage. Mr. Hallsworth submitted authorities that a traction-engine is a nuisance in the eyes of the law. Herbert Chadwick, a servant of the Corporation residing at Shaw, said the damage to gas-mains there was caused when a boiler was being taken out of Newtown Mills. It was allowed to lie for 24 hours on the road leading to the mill. Evidence was also given as to damage done to water-mains at Lees. After hearing the case for the defendant as put by Mr. Fripp, who said a traction-engine was not a nuisance in law, and that the damage was not caused in either instance by negligence, the Judge gave a decision for the Corporation; saying it was excessive traffic which had caused the damage. There was no doubt about this from the evidence.

Thefts from Prepayment Meters.

At the County of London Sessions at Newington last Wednesday, before Mr. M'Connell, K.C., Chairman, Edward Hill, 28, described as a labourer, pleaded guilty to stealing the sum of 3s., the moneys of the South Metropolitan Gas Company. Mr. Rostron, who prosecuted, stated that the accused tore down the automatic gas-meter in the house, broke open the money-box, and stole the contents. An explosion and a small fire followed. The Company took a serious view of the case, because there were 100,000 of these meters in the district alone, and all were at the mercy of thieves, who could steal the money and get away without difficulty. If there were a great number of such robberies, the price of gas to poor consumers would have to be advanced to meet the loss. Mr. M'Connell said he had been handed an extraordinary statement written by the prisoner, and asked the accused if he meant it to be read out. The Prisoner (impudently): Yes; I shouldn't have written it if I did not want you to read it. Mr. M'Connell said he would read it. It was as follows: "My Lord and Gentlemen of the Jury,—I plead guilty to setting the gas-pipe on fire with a match, after I had broken the machine down, with the full intention of burning the house down, and hoping that every house in the street would be burnt with it, which I'll cause to be done yet to get my own back off of some of the coppers' narks that live in it.—Edward Hill." Mr. M'Connell: And that is what you wish to say in mitigation of your sentence? I will give you a chance of withdrawing it if you like. What have you to say for yourself? Prisoner: Nothing, except what I wrote there. Mr. M'Connell: That shows me that you are worse than the police make out. Are you quite right in your mind? Prisoner (smiling): Right enough. Mr. M'Connell: Has the prison doctor seen him? The Gaoler: Yes, Sir. Mr. M'Connell: I do not quite believe you mean all you say, but you have a very bad past. The sentence of the Court is that you be sent to penal servitude for three years.

MISCELLANEOUS NEWS.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at Cannon Street Hotel last Wednesday—Mr. GEORGE LIVESEY in the chair.

The SECRETARY (Mr. Frank Bush) having read the notice convening the meeting, and also the minutes of the previous ordinary general meeting, the seal of the Company was affixed to the Register of Proprietors, and the report, with the statement of accounts for the half year ending Dec. 31 (*ante*, p. 346), was presented.

The CHAIRMAN: Ladies and Gentlemen,—As usual, I presume, the report will be taken as read; and it becomes my duty to move—"That the report and accounts now presented be received and adopted, and the report entered on the minutes." The predominant feature of the report is the price of coal. We have gone through a very trying period; there has not been the like since 1873. In that year, there was something very similar, in regard to the value of coal, to what happened last year; but in 1873 there were one or two differences. The maximum was reached at about March; and then the price gradually receded. It dropped 2s. in four or five months (by July or August), another 1s. by September, another 1s. by December, and another 1s. in January. Last year the maximum was reached at the same time (about March); but it was held on to with the greatest tenacity during the whole of the year. In 1873, the old South Metropolitan Company made short contracts for four or six months; and the coalowners assented without any difficulty. Last year we had considerable difficulty with the coalowners; the greater part of them strongly objecting to make a contract for six months. They said: "Your practice has been to contract for twelve months; and now that prices are telling in our favour, it is not fair to make a shorter contract. You ought to follow your usual rule." Well, we would not follow the usual rule; and, as the result, we had to part company with some of our oldest contractors. Some were reasonable, and some were unreasonable. We made six months' contracts; and in September and October it was necessary to renew them. We thought it possible that by that time there might have been a drop, as there was on the corresponding occasion 27 years ago; but the drop did not take place—partly, I think, owing to the stupidity of a number of the newspapers, and the ignorance of the public. The newspapers had got hold of some sensational statement, made by interested coal people, that coal would probably reach 50s. a ton at Christmas; and the public were persuaded to go in largely to fill their cellars at the lowest summer prices, which happened to be the highest prices that have been attained for 25 years. This hardened the market; and we had considerable difficulty in making our second six months' contract at the same price—an advance of 8s. a ton—that we made the contracts in March. However, we ultimately succeeded, and had to make our purchases at the same rate as before. We should have liked to have bought for only three months; but the coal people were unwilling to sell for three months, and for the greater part of our supplies we had to contract for six months—namely, from October to March. Consequently we are in the position that we have had to pay the full advance of 8s. a ton for our twelve months' supply. We have done no better by holding out than if we had meekly submitted to being walked over by the coalowners, and paid the 8s. right away last year. But we have the satisfaction of knowing that we did not take it lying down. We resisted to the utmost; and I believe I may claim for this Company, and a smaller Company, that we have done something to prevent the price of coal rising higher last year than it did. If we had not stood out as we did, there would perhaps have been an advance of 12s., instead of 8s. We did not submit meekly; and we have the satisfaction of feeling we did our best. Looking back on the twelve months, I do not see we could have done better. Had we known there would have been no frosts in December and January, we should not have laid in so large a stock. But not having yet arrived at the condition in business matters of following the prophecies of Old Moore and Zadkiel, we thought it better to lay in a stock, so as to be prepared for all emergencies in the winter. We might have had a long frost in December; and had we not had a large stock of coal, we should have been at the mercy of these people. We got through; but the result is we are paying a higher price for coal during the greater part of the current half year. Two-thirds of the consumption is in the first three months, and we expect in the latter three months to get coal at a reasonable price; but unfortunately coke has fallen off more rapidly than coal. Though we did very well with coke in the preceding half year, the price at present is not at all satisfactory to gas companies; and we shall not receive anything like the same amount in the current half for coke that we did in the preceding six months. The second paragraph of the report speaks of the increase in the price of gas. The additional expenditure, as the report shows, has been about £250,000, which has been met partly by the additional receipts for coke; but if we had not increased the price of gas, the deficiency would have amounted to more than the whole of our dividend. There was therefore the absolute necessity to raise the price. We greatly regretted it, for a good many reasons. One of the chief of these is that it tends to check the consumption; and another is that we do not like to take anything unnecessarily out of the pockets of our consumers. But it is part of the bargain. And let me say a word for the consumers. We have had no complaints of the increase of price. We explained the matter to the consumers at the time of the advance; and we had several letters expressing satisfaction at such an explanation, and no complaints, and no objection to pay the increase. But the consumers have done this—they have reduced the consumption, I think very wisely and very properly. I do not blame them for that. It must be remembered that the sliding-scale is a scale to act both ways. I am in a position to state what it was that led to the introduction of the sliding-scale in 1873. In that year the whole additional cost of coal was taken out of the pockets of consumers; the Gas Companies raised their price and recouped themselves the entire extra outlay. It was felt this was not fair; the burden ought to be shared. Hence the proposal which Parliament adopted—that whenever there was a reduction in the price of gas, the shareholders were to have a slightly increased dividend, and whenever the price of gas went up, they were to have a reduction of dividend. This arrangement was introduced in 1876. It worked very well—nearly always in favour of the consumer until last year. Whenever we could make a saving of £40,000 in the year, we reduced the price of gas 1d. That gave the consumers £40,000, and it entitled us to an additional £5000 or perhaps £6000, which was one-eighth to us and seven-eighths to the consumers. And now that the process is reversed, they have to bear not seven-eighths of the loss, but perhaps three-quarters; and one-quarter of it has to be borne by the shareholders and employees, and the reserve funds. I think the consumers accept it as fair; and I think it proves the sliding-scale a satisfactory arrangement. It is fair for both sides; and soon the consumers will begin to reap the benefit of it. The report also gives the result of the year's working. There is a deficiency of £9089; and this will have to be met from our reserves, which we have been painfully and laboriously building up during the last eight or ten years. The employees lose their profit-sharing bonus for the half year, which amounts to quite £11,000; and the dividend payable—not the dividend paid—is reduced by £19,796. That is, we were entitled to pay that much extra dividend before we increased the price. We did not pay it, because we thought, and the shareholders agreed, that it was not desirable to increase the dividend until we were pretty certain that we should not have to reduce it again materially. We are now paying a dividend of 5 per cent.; and I think it right to tell the shareholders that there is no probability of this dividend being reduced, and neither is there a probability of it being increased very early. We shall get a reduction in the cost of coal, no doubt, this year. We shall also lower the price of gas, at June, somewhat—we do not know how much, but not less than 2d. per 1000 cubic feet; and this, under last year's Act, will give us just the same 5 per cent. dividend. This Act made an alteration. Under the old system, we were entitled to an advance of 2s. per cent. for each 1d. reduction of price. Under the Act of last year, we are entitled to an advance of 2s. 8d. per cent. of dividend. So that when we get our prices down below a certain point, we gain. But, on the other hand, whereas our starting-point under the 2s. system was 3s. 6d. per 1000 cubic feet, our starting-point now is only 3s. 3d. per 1000 cubic feet. So that we lose something at one end to gain it at the other. When we get our price down below 2s. 6d., we shall be entitled to a rather higher dividend than we were entitled to under the old system. The paragraph that I draw your attention to next is in reference to public lighting. The public lighting is entirely in the hands of the Local Authorities; and there has always been the greatest difficulty in getting it improved, as the Authorities are not, and never have been, prepared to spend money upon the public lighting. The alteration of the lighting would necessitate the expenditure of a considerable amount of money, as the lanterns would have to be altered, and they would have to be fitted with different burners. The old flat-flame burners would have to be taken off and be adapted to the incandescent system. The alteration of the lamps would cost money; and none of the Local Authorities were prepared to spend money upon it. So the Company went to them, and said: "Under the incandescent system, the consumption of gas would be materially reduced; we should be able to supply the gas to the old lamps at a lower rate per annum than under the old system. We therefore propose to alter from the old to the new, if you will continue to pay the old rate until the cost of the alteration is made up. That might amount to £1 or more a lamp, and the saving might be 6s. or 7s. a year; so that in the course of three or four years the cost of the change would be met." They agreed; and we are now working on that system. We went a little further, to show that companies are not altogether devoid of enterprise. I daresay you remember the old-fashioned octagon lamp-column which has been in existence from time immemorial. We proposed to put a handsome lantern in the main thoroughfares; but when we fitted an improved lantern on the old column, it did not do at all. We then made a further offer to the Vestries, which they accepted—not that we would replace the old columns all over the district, but that in the leading thoroughfares we would supply them with an improved column in exchange for the old column. We were to take down the old ones (which were worth about 25s.), and put up the new ones—called the "Eddystone's" (costing about £3, owing to the increased value of iron), on condition that they would let us take the old columns into stock, and sell them back later on for new lamps in the small streets. The effect of this is that the Company have been giving something like 30s. to £2 a lamp extra for these new columns and lanterns, in addition to what they obtained from the parishes, for the main thoroughfares. We are told by those who are interested in it, that the lamps and columns have given great satisfaction. Now I am on the subject of public bodies, I may mention another matter. The difficulty is how to deal with these people. I daresay some of you have seen something in the papers about the extraordinary meter at Rotherhithe. That was a tit-bit for the newspapers. The gas-meter at the Rotherhithe baths had a peculiar index. Instead of registering 100 cubic feet, the lowest dial registered thousands. This is the only meter in the district, I believe, with an index like that; and our people read it in the ordinary way. I cannot say this is altogether creditable to our people. It showed a want of thinking, at any rate. However, the mistake was made; and for eighteen years we were charging the Rotherhithe baths only one-tenth of what we ought to have charged. The difference amounted to £2900. When it was found out, we sent in a claim for the amount. Of course, we did not expect they would pay it; but we thought it right to let them know what amount they owed us for gas. They made fun of it, and said they would not pay. We took Counsel's advice, and were told that the Statute of Limitations would prevent us claiming beyond six years; so we sent in an amended claim for this period. But as to paying it, that never entered into their minds; and we are obliged to go to law to compel payment. I mention this circumstance for a special reason. A good deal of talk took place at the time; and one day travelling home a gentleman of high standing in the City remarked to me about

it. I said to him: "Suppose it had been the other way; suppose we had taken £2900 too much from the Rotherhithe baths. What then?" He replied: "What then?" I said: "Of course, we should have returned it." He asked: "Do you mean to say that?" I said: "Of course, as honest people we should not have thought of doing otherwise. If we had taken this extra money from them, and had refused to return it, what an outcry there would have been." Here I may mention that we have had two similar cases during the last ten years. Two meters went wrong—or rather one meter was right, but our own people were wrong in reading it; and in the other case the wheelwork of the meter was out of order. One was to the extent of £1200; and immediately we discovered it, the Directors gave orders to the Secretary to return the money to the firm, with 3 per cent. interest from the time the meter was originally fixed. We took care to do it very promptly, before we were asked to. The other was the case of a private consumer, who had his meter tested. A wheel in the index was wrong; and we at once returned him the money he had over-paid. We found out that his predecessor had had the same meter; and we also returned him his money. We followed the meter back to the time when it was new. We discovered the gentleman who had had it first; and we took the trouble to return his money to him—going back fifteen or eighteen years. There is no credit in such a thing—it is simply honest; and we claim to conduct our business honestly and fairly. I mention this in order to show we are not the sort of people that we are generally supposed to be. The next paragraph to which I would refer is the question of our profit-sharing arrangement with our employees. It is commonly said that profit-sharing systems are failures—and so they often are. The mere distribution of an annual bonus to workpeople soon loses its effect—mainly because it does them no permanent good. If you give a man £4, £5, or £10 year by year, he will reckon upon it, and generally spend it. If it induces better work, cheerful and willing work, as it does in our case, and leads the men to do better than they otherwise would do, it is a benefit to the Company. But that benefit would not be maintained unless the workers felt that it was benefiting them. The only way a system of this kind can permanently benefit the workpeople, is to enable them to become property owners themselves; and the system we have adopted has been to induce them by every possible means to invest their bonus in the Company's stock. Up to 1894 some £5000 was voluntarily invested. We then altered the system, and made the bonus payable half in cash and half in stock; and now the value of stock owned by our employees is £103,000, besides £30,000 on deposit, which is left in our hands at interest. It is not a small thing for a body of workpeople mainly—our officers also have their share, but the workmen outnumber them—to be possessors of at least £133,000 accumulated in 12 years; and that is the substantial benefit which they derive, and the guarantee that the system is likely to be permanent. I do not know that I can say what is the feeling of our workpeople towards us; but I can say for the Directors and the officers that, as to the workmen, we never have a moment's anxiety. The next point is the Company's Bill; but as that will form the subject of the extraordinary meeting, I will conclude by a few words on the prospect of the gas industry. It is 100 years since gas was first introduced. I believe the first real introduction of gas was by William Murdoch, to light James Watt's manufactory at Birmingham. In the early part of last century, gas was first used in the public streets of London; and so it went on slowly making its way. Its only competitor then was the candle. Oil was expensive, until we come to the middle of the century, when paraffin oil and paraffin candles were introduced. That was about 1860. Then we come in the seventies to the introduction of mineral oil at 5d. or 6d. per gallon, against 6s. and 5s. for sperm and colza. The mineral oil was a serious competitor with gas; but gas survived. Then came another competitor. We have had competitors from above and beneath the earth; but we are living still. Incandescent burners have enabled us to distance all competitors. There is no doubt whatever that all artificial lights could be dispensed with much easier than gas. I have taken out a few figures to show the growth of the industry. I cannot get the consumption of gas further than sixty years back. In the old South Metropolitan Company in 1840 the consumption of coal was 20,000 tons; by 1850 it had increased to 50,000; by 1860 it had increased to about 100,000 tons, by 1870—I have the exact figures now—it had increased to 224,000 tons; in 1880 to 387,000 tons; in 1890 to 690,000; and in 1900 the consumption by this Company was 1,131,000 tons. From 1880 to 1890 there was about 220,000 tons increase in the year's consumption. The year 1900 exceeded that of 1890 by no less an amount than 493,000 tons. We can only judge of the future by the past; and seeing that the consumption of gas has increased in a greater ratio lately than it had done for some time previously, I think we can take heart, and, notwithstanding all its competitors, it is going to hold its own. I ought now, perhaps, to allude to one of the difficulties that gas companies have to deal with; and this is a danger ahead to which I wish to draw public notice. In the near future there will be a vast extension of electric trams and railways; and the electricity, when it has done its work in working the tram cars or the railway train, is, so to speak, a refuse product. It is of no use to the electric company; and all they want is to get rid of it as easily and quickly as possible. It has to return back; and the simplest way when it has done its work is to conduct it to the rails, or to the gas and water pipes, and let it find its way back as it pleases. But it does mischief in travelling along the pipes. It does no harm at all when it reaches the pipe; but when it leaves it, some of the metal of the pipe is carried into the soil, and great danger has resulted from that cause in America. In many cases the iron pipes have been eaten right through, serious escapes have taken place, and explosions and accidents have resulted. I saw only the other day that the American Courts had held that in the case of an accident, the gas company were liable for damage, though it was caused by the electrolysis of their mains. The gas and water companies are all taking steps to protect themselves; and I was rather surprised last night to receive, from a friend, a circular issued by the London Chamber of Commerce. That body have taken up the question of electrical traction; and they say that the Acts already provide that reasonable precautions shall be taken, but that there is somebody in Wrexham—where an electric tramway is to be started—who wants to get this clause inserted: "Notwithstanding anything contained in the Wrexham District Trams Act, 1873, or in the Wrexham District Tram Order, 1899, the promoters shall be liable for any loss or damage to the water mains or pipes of the Wrexham Water-Works Company resulting from fusion or electrolytic action caused by any current generated or used for the purpose of electric traction on any of the tramways authorized by the said Act or Order." In the circular, the London Chamber of Commerce say: "The prejudicial effect of this, and its far-reaching consequences, on the electrical traction industry will be seen at once; and it is most desirable that no promoters should give way upon the point, or agree to any modification of the Joint Committee clause, and arrangements are being made to fight a test-case during the ensuing session in the general interests of the electrical industry." Why the Chamber of Commerce should take up the cudgels in favour of one industry alone, I do not know. That the electric traction people should be at liberty to let their electricity escape, to the damage of everybody and anybody who has iron in the streets, is a doctrine which cannot be admitted for a moment; and I can assure you that the gas and water companies intend to oppose all such Bills until they give us the only protection which is worth anything—namely, insulated return conductors. It will not do to leave it simply to any damage they may cause; because, when there are a number of these undertakings in the street, it will be impossible to find out who did the damage—the same as it was in the salt districts, where settlements continually took place and houses came down. Here they could not find out which company drew the brine away, and, consequently, there was no remedy. I am told the time will come in London when there will be so many of these companies that it will be impossible to find who did the injury; so we shall therefore do all we can to protect ourselves. I will now conclude by making this remark, that you may take your modest dividend of 5 per cent. with a clear conscience that it has been earned honestly—it has not been earned by treating any of your customers unfairly, or by sweating or grinding the poor. We treat our workpeople fairly and our consumers fairly. I beg to move the resolution for the adoption of the report, in the terms already mentioned.

Mr. JOHN MEWS seconded the motion, saying that, after the able remarks of the Chairman, he should not make any allusion to the points upon which he had touched, but merely call attention to the general fall in the value of securities from the year 1899 to the present time, and contrast the fall in the ordinary stock of the Company with the fall in first-class securities, so as to show that the fall in gas stocks was less than it had been in any other securities. In the year 1899, the value of securities began to fall rapidly, owing, no doubt, to the South African war and to various international complications—China, and so on. Consols had fallen from 111 to 97, which was a fall of 13 per cent. The Local Loan stock had fallen from 111 to 100—a fall of 10 per cent. The London County Council loan, which stood at 97 in 1899, had fallen to 88—a reduction of 10½ per cent. Liverpool Corporation stock had fallen 9 per cent. Midland debenture stock had fallen 10½ per cent.; and London and North-Western debentures, 9½ per cent. The price of South Metropolitan stock in 1899 was 148; and at the present time it stood at about 136—a fall of 12 points, or only 8 per cent. This fall was less than any of the first-class securities he had mentioned; and it showed conclusively that the public were satisfied with the way in which the business of the Company was conducted.

A SHAREHOLDER, speaking as a trustee, said nothing gave him greater satisfaction than to see the perfect harmony which reigned at the Board. Universal goodwill existed from the Chairman to every employee; and so long as this continued, there would be a shining light over the South Metropolitan Company, because it carried the confidence of the shareholders.

Mr. KEATING thought one reason for the decreased consumption of gas was the increased consumption of electricity.

A SHAREHOLDER asked at what price the Company's coal contracts had been made.

The CHAIRMAN said it was not usual to state this; but he might say the contracts were made last March at 16s. a ton f.o.b. in the Tyne, and were renewed at 16s. a ton, added to which was the freight, ranging from 3s. 6d. to over 4s. Gas coal, including freight, was now 13s. a ton in London. There had been no increase in the use of electricity in their district, though there had been a large increase in incandescent gas lighting. Incandescent burners burnt much less gas. A friend of his recently told him that at one time he had eight burners in his office, and that now he got a better light with three incandescent burners than before; so that this gentleman was burning about 12 feet of gas, as compared with 40 feet. This accounted to some extent for the decreased consumption. But the chief cause was the increase of price during the past year, and the public naturally reduced their consumption. Debenture stock to the value of £80,000 was offered for sale by tender a few weeks ago, and all but £13,000 was taken up, which could be had, on application to the Secretary, in multiples of £5 at the reserve price of 94.

The resolution was then passed unanimously.

Mr. J. EWART (Deputy-Chairman) said the Chairman had explained fully the reason for the diminution in dividend; but he believed they were at the bottom of the poll, and within a reasonable distance of arriving at the success to which they had been accustomed. He begged to move—"That a dividend at the rate of 5 per cent. per annum be now declared, and that the warrants be transmitted to the registered addresses of the proprietors by post."

Mr. H. T. AUSTIN seconded the motion. He said capitalists were usually supposed to have hard hearts, and to show no sympathy; but this could not be true, as a good deal of sympathy had that day been shown to the workmen. When the stokers left in 1889, they declared they only left the residual of mankind to the South Metropolitan Gas Company. But, looking at it from a higher standpoint, and making a comparison with the Trade Union according to a return made a few months ago, the funds of the Union would only allow a distribution of 3s. per man, as against £37 per man in the employ of the South Metropolitan Company. This would confirm what had been said in reference to the workmen of the Company. The dividend had been earned no doubt under difficulty; but it would be received in the spirit in which it was tendered. The works, he was pleased to say, were in a good condition. He thought coalowners were not just towards the rest of

mankind, as they were robbing one part of the community to enrich themselves.

The resolution was passed unanimously.

The retiring Directors (Mr. John Ewart and Mr. John Mews) and the Auditor (Mr. Thos. Spooner Soden), were unanimously re-elected.

Extraordinary General Meeting.

The SECRETARY having read the notice convening the meeting,

The SOLICITOR read the heads of the proposed Bill.

The CHAIRMAN: I beg to move—"That the Bill now submitted to this meeting, intituled 'a Bill to empower the South Metropolitan Gas Company to raise additional capital and to purchase, by agreement, so much of the southern portion of the undertaking of the Gaslight and Coke Company as is situate in the County of London south of the Thames, and for other purposes,' be and the same is hereby approved, subject to any amendments that may be made therein by Parliament and approved by the Directors." The proposal to purchase the southern district of the Gaslight and Coke Company is simply in accordance with the recommendation of the House of Commons Committee of 1899, who recommended that the transfer should take place. The Committee came to the conclusion that such a transfer would be advantageous to the consumers, and not disadvantageous to the Company. We are in a position, somehow or other, to sell gas cheaper than the Company on the north of the Thames; and if we get the works, we can make gas there and buy our coal as well for those works as we buy for our existing business. The other matter is the increase of capital. We are getting to the end of our tether. Our business is increasing at such a rate that within two years our capital may be all exhausted; and we therefore think it is an opportunity to ask Parliament to give us some moderate power (say, £1,000,000) if they do not sanction the transfer of the southern district. Another point is that an alteration may be made in the method of issuing our capital—that we may offer it at a fixed price, and not by sale by auction. It is to a very limited constituency that the auctioneer appeals. A number of people would like to buy; but they cannot attend on the special day. Sale by tender is extremely unsatisfactory, because the ordinary public do not understand it. The Government themselves issued the greater part of the War Loan at a fixed price; the London County Council find it advantageous to issue their loans at a fixed price; and we have done the same for some years by indirect means. We simply want the authority of Parliament to offer it at a fixed price in the first instance. We first offer it for sale by tender; and if not sold, we offer it at a fixed price. We are in this happy position, that if Parliament refuses permission, we shall not be on our beam-ends.

Mr. SIMPSON ROSTRON had much pleasure in seconding the motion. It was an expensive thing going to Parliament; and they did not go there without maturely weighing the matter. They wished to follow out the recommendation of Parliament by acquiring the southern portion of the district supplied by the Gaslight and Coke Company, as they believed it would be for the best interests of the Company.

A SHAREHOLDER asked whether the two Companies had agreed upon a sum for the southern district.

The CHAIRMAN said they came to an agreement last year; but this was now off. The Directors would take care not to sacrifice the interests of the shareholders.

The resolution was passed unanimously.

Mr FOSTER proposed a vote of thanks to the Directors for the able way in which they had conducted the business of the Company during the six months He hoped the prediction of the Chairman with regard to coal would be verified, and that they would soon return to the low price for gas which was charged a few years ago.

A SHAREHOLDER, in seconding the motion, said it was always a pleasure to listen to the interesting addresses of the Chairman. He wished all the other companies in which he was interested were conducted on the same generous principles as the South Metropolitan Company was.

The resolution was passed unanimously.

The CHAIRMAN said at that late hour he thought he should best consult the feelings of the shareholders by simply saying: "I thank you very heartily for this very kind vote." He then proposed a vote of thanks to the staff of the Company.

Mr. ROBERT MORTON seconded the motion, which was put and carried unanimously.

The CHIEF ENGINEER (Mr. C. C. Carpenter) responded.

The SECRETARY, in replying, took occasion to mention that, although the increase in the consumption of gas in the six months was slight, still for the whole year it worked out at 7 per cent., as against 6 per cent. in 1896, 4 per cent. in 1898, and 4½ per cent. in 1899.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The Prices of Gas-Works Supplies—A Suggestion.

The Ordinary Half-Yearly General Meeting of this Company was held last Friday, at the Albion Tavern, Aldersgate Street, E.C.—Mr. GEORGE LIVESEY in the chair.

The SECRETARY (Mr. Charles M. Ohren) read the notice convening the meeting; and the Directors' report and the accounts, of which the principal points appeared in last week's issue, were taken as read.

The CHAIRMAN said it became his duty to move the adoption of the report and accounts. In making this motion, he was perhaps expected to offer a few remarks to the proprietors, more in the shape of comment on the report than anything else. The first paragraph, he thought, was perhaps the most interesting to everybody—both to shareholders and consumers. The Company had had a very serious time in the matter of the purchase of coal during the past twelve months; but the high prices were rapidly passing away. He thought he might take credit to this Company for having done something towards checking the rise in price that was going on at such a rate last year. It had been their practice to buy all their coal from Durham; they had scarcely ever bought ordinary coal from anywhere else. But when the Durham coalowners last year put up their prices 8s. per ton, the Directors looked about to see whether they could not do better by purchasing elsewhere; and fortunately offers of coal came to them from the Midlands at a lower price. They found they could purchase coal delivered on the works at something like 2s. a ton less than they would have had to pay for Durham coal. They therefore arranged for the whole of their supplies for the twelve months to be taken from this source; leaving Durham severely alone. The quantity which they took from Durham was about 110,000 tons, and their neighbours also took a very large quantity of their supplies from Durham; so that between the two adjoining Companies something above half a million tons which had hitherto been purchased from Durham were obtained elsewhere. He was quite satisfied that the action of the Company in dropping the Durham contractors entirely had some effect in making them moderate their intentions as to price; because he believed they would not have stopped at 16s.—an advance of 8s.—but would certainly have wanted more. Therefore he might claim for the Company that they had done their part in checking the great rise in the charge for coal. The coalowners seemed to have found the train of trade going at express speed, and they put on the brake, and had kept it on, with the result that they had pretty nearly stopped the train. They were now finding the disadvantage of this. They could not sell their coal; and they were begging the gas companies and others to take it. Only the previous day, he heard of a contract having been made for Newcastle coal at 9s. 6d. per ton f.o.b., against 16s. this time last year. This at any rate was satisfactory; but the most gratifying feature in this progress was that, with the fall in the price of coal, there would be a fall in the price of gas. Last year they did not buy coal for a whole twelvemonth—they bought only for part of the year, and unfortunately at the time they were renewing the contracts in the autumn, the price had hardened somewhat, and they were not able to buy at a lower price than they paid in the spring. Therefore they were fixed with the high-priced coal for the twelve months. The higher-priced coal had not all been delivered yet. Consequently, the Directors would not be able to reduce the price of gas just at the moment; but they would certainly be in a position to do so from Midsummer. The Board did not know to what extent they would be able to go; but a substantial reduction would no doubt take place from that period. While this would help the consumers, it would also help the shareholders, as it would entitle them to an increased dividend. It would also help the employees, because it would entitle them to an additional bonus under the profit-sharing scheme. This, he thought, was the most satisfactory announcement he had to make that day. The second paragraph of the report spoke of the receipts for coke having advanced 1s. 10d., against the 5s. 10d. advance in the cost of coal; but other products remained stationary. While he was on the question of the accounts, he might say that not only had coal been very much more expensive, but other goods—lime, for instance, for purification—had cost a great deal more. In fact, everything the Company had to purchase—everything in the shape of iron, materials, or apparatus—had been dearer. The gas-stove makers had put up their prices, and the meter makers theirs; and it was all shown in the increased items of expenditure in the Company's accounts. He had a little grievance against the sellers of apparatus to gas companies, with their 20 per cent. dividends. They were very much in the habit of considering that gas companies were their best customers; and what they meant by "best customers" was the customers who could pay the highest price for what they had to sell. In the case of this Company, for example, there were about 17,000 stoves on hire; and they bought them (say) by the hundred. Other traders bought from the makers (say) one, two, or three at a time—possibly by the dozen; but it could hardly be believed (he knew it was a fact, though perhaps he could not prove it in a Court of Law) that the stove makers gave a larger discount to the ironmonger who bought in small numbers than they did to the gas companies who practically kept them going. Their Engineer had just told him a little fact which was worth mentioning. The Company did a good deal of stove repairing, and bought the parts, such as doors, tops, sides, taps, and burners—not in odd ones, but in quantities. Their Engineer assured him that it would pay them better to buy the complete stoves, and pull them to pieces, in order to get the parts necessary for repairing the stoves that came in, as the makers charged more for the parts than for the whole, though in putting them together there was a certain amount of expense involved. The idea had occurred to him that gas companies ought to do something for their own protection. He was going a little bit astray now; but he wished to say this. The great co-operative movement was started for the purposes of distribution. Those who took part in it formerly bought their articles—flour and everything else they sold—from the ordinary manufacturers; but at last they thought it would be better to become manufacturers themselves, and they established what was known as wholesale co-operation, which was a business now of enormous extent. They had flour-mills, shoe manufactories, woollen factories, clothing factories, and he did not know what else manufactory for the co-operative stores. Now why should not gas companies unite? It would be a perfectly legitimate thing for officers, directors, and shareholders in gas companies to join and subscribe their money and form a Company for the supply of meters, stoves, and all kinds of manufactured articles required by gas companies—their dividend to be limited (say) to 10 per cent., and all excess profits to be divided between the promoters of these co-operative concerns and their customers. The stove makers raised their prices 7½ per cent. in consequence of the increase in the cost of iron; and the meter makers did something of the same kind. He was anxiously looking forward for an announcement from these gentlemen as to a reduction in price, now that iron had gone down. This, however, was all aside. But it bore upon the general prosperity of the gas industry; and some of the gas companies were quite big enough to make their own things. Mr. Shoubridge was prepared to undertake the manufacture of meters and stoves for this Company, if the present makers were not disposed to be reasonable. Returning to the accounts, it would be seen that these extra expenses showed their effect in this way: In December, 1899, they had a balance to carry to the net revenue account of £18,909; in December, 1900, the balance was only £13,700, or £5200 less, notwithstanding the increased receipts for coke and other things, and the

increased price of gas into the bargain. The net deficiency this half year was something like £4642. Fortunately, they brought forward a balance of £4795; and they took from this the £4642 necessary to pay the reduced dividend of 5 per cent.—carrying forward an undivided balance of only £152 18s. 6d.. Having the undivided balance of £4795, they did not touch the reserve fund at present; but it was possible they might have to do so for the June half year. After then he believed they would be all right. He might remark that the proprietors had given up ½ per cent. of dividend, which amounted in the half year to rather over £1400; the employees, under the profit-sharing scheme, gave up about £700; and the consumers made up part of the deficiency. The third paragraph in the report stated, in some detail, what the Company had done in reference to their profit-sharing system. It had been applied to the whole of the employees; and it was on the principle of the sliding-scale. The sliding-scale gave the proprietors an increased dividend with reductions in price; and this had been extended to the employees. They gave them 1 per cent. on the annual amount of their salaries or wages—1 per cent. for every penny at which gas was sold below 3s. per 1000 cubic feet, which was the mean of the Company's initial price, which ranged between 2s. 10d. and 3s. 2d. Thus the employees had practically the same starting-point as the shareholders. If by intelligent, good working they could effect savings in the manufacturing departments of the Company, these savings would enable the Directors to reduce the price, to increase the dividend to the shareholders, and entitle the employees to an increased bonus, payable annually—half in cash and half in stock. The salvation of any profit-sharing system was that it acted beneficially on both sides. If it did not induce better working—more intelligent and more interested working—it failed to accomplish its object; and if, on the other hand, it did not permanently benefit the employees, it would sooner or later come to grief. The test (it was an unfailing and perfectly reliable one) was the fact that, in six years, their employees had accumulated in the Company's hands £12,600. Many of them held considerable amounts as shareholders; and this had given them a totally new interest in the Company's prosperity, and had at the same time lifted them from the position of wage-earners to that of capitalists. One test of the success of the system was (and he thought the Engineer would bear him out that it was a fair test) that before it was introduced, the cost of carbonizing was about 3s. 6d. per ton of coal. He did not say that the whole reduction was due to profit-sharing, but he did claim that a notable proportion was. Well, the cost of carbonizing per ton had come down to just under 2s. 5d. There they had 1s. per ton saved. Part of it was no doubt due to the introduction of machinery; but machinery was not of much use unless it was worked intelligently and well. It was too much the habit of trade unions to limit the amount of work a machine might do. But Mr. Shoubridge could again bear him out that, so far as the Company had machinery, the men were working, and willingly working, it to its full capacity, and willingly doing their other work. Good management was not of much use unless they had at the same time the earnest co-operation of those who had to do the work. As he had said, by the willing co-operation of their employees, they had reduced the carbonizing wages quite 1s. a ton; and this on 100,000 tons represented £5000 a year. Therefore both the Company and the employees benefited; and so long as the system continued to act in this way, he thought there was no doubt it must be considered a success, and would last. The next paragraph in the report referred to the dividend. Last time the proprietors were entitled to a dividend of 5½ per cent.; but they were now only entitled to 5 per cent. There was no probability of it going below 5 per cent.; and he held the hope that it would shortly get up again to 5½ per cent., which was the highest they had ever paid. Their rule had been not to pay more than it was tolerably certain might be relied upon as continuous. In reference to the gas industry generally, he could claim for it what very few other industries could claim. Sixty years ago (though he was not engaged in the industry then, he could trace it back that length of time), the price of gas in London was 9s. per 1000 cubic feet; it was now about a quarter of that. He thought this was a tolerably good proof of what the gas people had done for their customers during the whole of these sixty years. There had always during this period been men, who had passed away, who had been animated by a desire to do the best they could for the consumers; and doing the best for the consumers, they had done the best for the industry. But while there had always been a number of men who had been pressing for reductions of price, others had said the price was cheap enough, and had stood in the way. But that did not repress those enterprising people who had exerted themselves to continually make the cost of gas lower; and the result had been the bringing down of the 9s. to a little more than 2s per cent. of that amount. They had thus shown they had done their duty to the public; and the public he thought had appreciated them—at any rate, he believed they would be sorry to do without them now. He did not think there was the slightest fear, or the slightest risk, of gas failing to hold its own in the fierce competition to which it was exposed. There was a funny thing about the consumer. The consumer did not know much about the quality of gas. He had been told there had been some remarks made about the gas of this Company not being quite so good as it ought to be. The fact was that, during the past half year, it had been considerably better than it need have been. The Midland coal they had purchased had produced 17-candle gas. This had been mixed with a certain proportion of carburetted water gas, which had reduced the illuminating power to 16½ candles on the average, while they were only required to supply 15 candles. He had heard of towns where the quality of the gas had been reduced 2 and 3 candles; and the public had been better satisfied. Gas managers had stated to him that they had fewer complaints when selling 14-candle gas than when selling 17-candle. The whole thing was really in the burners; and the incandescent burner was the one to which they were looking forward for assistance. The day was not far distant when gas would be used almost universally in incandescent burners, which had increased the quantity of light obtainable from the gas by as much as tenfold. He did not say the ordinary incandescent burner would do this; but the one that was used with rather higher pressures of gas—9 inches, as fitted by Mr. Sugg in the Crystal Palace and elsewhere, instead of 2 or 3 inches—gave 30 candles per cubic foot of gas, whereas the old London argand gave 3 or 3½ candles. By increasing the pressure of gas, they could get ten times the quantity of light; or, without increasing the pressure, they could obtain five or six times the quantity from the same amount of gas. The Company had just been offered what was stated to be an unbreakable mantle; and they would be very glad to see such an article. There was no doubt that improvements would be made in the mantles; and the day was not far distant when, as he had said, incandescent lighting would become universal. Then their competitors might look out.

Mr. ROBERT MORTON seconded the motion, which was unanimously adopted.

Proposed by the CHAIRMAN, and seconded by Dr. FREDERIC HETLEY, a dividend was declared at the rate of 5 per cent. per annum on both the preference and ordinary stocks.

On the proposition of Dr. HETLEY, seconded by Mr. MORTON, the Chairman was returned to his seat at the Board, as was also Dr. Hetley, on the motion of the CHAIRMAN, seconded by Mr. C. LEA WILSON. The last-named gentleman, in the course of his remarks, said he was now over 85 years of age; and it was uncertain whether he might meet the proprietors again. He should therefore like to take the opportunity of saying that, in Mr. Shoubridge, they had a first-rate Engineer—one who worked hard, and one who thoroughly understood his duty. He (Mr. Wilson) had been constantly on the works, and could testify as to the character of their Engineer's work, and the manner in which he performed it. They had a good man; and he advised the proprietors to take care that they kept him.

The CHAIRMAN said the next business was to elect an Auditor in the place of their late friend Mr. A. G. Hounsham. He was an excellent Auditor, and a good man to have as a colleague. He died comparatively early; and the vacancy had now to be filled. There was only one candidate.

Mr. H. E. JONES proposed the election of Mr. Samuel Wood, F.C.A., of the firm of Messrs. Lass, Wood, and Drew. He had known Mr. Wood for many years in connection with the auditing and examination of gas accounts; and he (Mr. Jones) held the conviction, having some acquaintance with gas undertakings, that an audit was of little value unless it was done by a practised hand. For these reasons, he had much pleasure in moving Mr. Wood's election.

Dr. GLAISHER seconded the motion; and it was unanimously agreed to.

Mr. WOOD thanked the proprietors for this token of their confidence, assuring them that he should exert himself to show that it had not been misplaced.

On the motion of Mr. JONES, seconded by Mr. T. H. HOW, Mr. Thomas Guyatt, the retiring Auditor, was re-appointed.

Mr. JONES said, though he had intruded himself upon the attention of the proprietor's twice, he would ask permission to move a vote of thanks to the Chairman and Directors for their services, if only for the purpose of following the lead of their worthy Chairman in one or two very significant hints he had given. It was undoubtedly the fact that there was an impression abroad among traders that gas companies could afford to pay anything they liked to ask. The coalowners, for instance, knew the companies must have coal in order to make gas; and they knew exactly what were their requirements. Therefore, by putting their heads together, they would see that the companies paid more than they should do. It was not perhaps quite of the same nature as the subjects to which the Chairman had specially referred; but it was a question whether they could each go the length of getting their own coal. But he was strongly of opinion that if they were all brewers, instead of gas makers, they would at any rate have a well of their own, and they might even go to the extent of growing a little barley. (Laughter.) Certainly, he saw no reason why their business should be made the base-ball or cock-shy of traders. He did not like the way in which, after investing his small savings in gas companies, his dividend was threatened and the business and consumers upset by arbitrary decisions to raise the price of coal 50, 70, and 100 per cent. It was monstrous; and perhaps it would be wise to put this issue before Parliament—whether the companies should not have a little hold upon part of the sources where their coal came from. The price of pig iron had gone down to probably nearly what it was three years ago; but still there was no reduction in the price of pipes and stoves. As they had heard from the Chairman, parts of stoves and rough castings worked out dearer than the stoves themselves. This was taking a decidedly unfair advantage of the companies. The general impression was abroad that the companies cut their fat very fat indeed. The manufacturers did not seem to know that the companies had to raise their capital at about 4 per cent.; but they evidently did think that the companies could well afford to be pressed down, especially in the case of wrought tubing for laying services and for the supply of coin-meter fittings. In connection with the prepayment supplies, a great deal of tubing was required. They used to get 75 per cent. discount off the total gross. Now they only got 50 per cent. off the gross; and it followed that, instead of paying 25 per cent. of the whole, they paid 50 per cent.—that was to say, the price was double. Do what he could, he could not force these makers down. In his opinion, the time had come when they should make tubes themselves; and the big companies could do so by combining together. He was of opinion that some such combination as the Chairman suggested, protected in regard to the profits in the way he mentioned, would work. He concluded by eulogizing the services of the Chairman and Directors, to whom he proposed a vote of thanks.

Mr. W. H. COE seconded the motion, which was heartily endorsed by the proprietors.

The CHAIRMAN, having responded, paid a high tribute to the devotion to the Company of the two chief officers, their staffs, and the general body of the workmen.

Mr. MORTON seconded the motion, which was cordially agreed to.

Mr. SHOUBRIDGE, in the course of his acknowledgment, said it had given him and his men very great satisfaction to notice that the Directors in their report had remarked that the diminution in the bonus had been accepted by their employees in a proper spirit. Never in his experience had the men worked more thoroughly and heartily than in the past half year. As to the works, they had been considerably improved, and were in a much better position than they had ever been in before.

An expression of thanks from Mr. OHREN, on behalf of himself and staff, concluded the proceedings.

SHEFFIELD UNITED GAS COMPANY.

Half-Yearly Report and Accounts.

At the forthcoming Meeting of the above-named Company, the Directors will report that the quantity of gas sold in the six months ending the 31st of December last exceeded that for the corresponding period of 1899 by 42,865,000 cubic feet, or 3·19 per cent. Bearing in mind the mildness of the weather during the last month of the year, the Directors consider this may be regarded as satisfactory, more especially as the increase in the second six months of 1899 was 9·87 per cent. over the same period of 1898. The accounts accompanying the report show that the sale of gas in the half year brought in a revenue of £143,922; the rental of meters and stoves raising these figures to £151,008. By the sale of residuals, a sum of £69,263 was produced; and miscellaneous items made up a total of £222,421. The expenditure on manufacture was £150,531 (coals costing £100,552); on distribution, £12,070; and on management, £5352—the total being £178,806, leaving £43,615 to go to the profit and loss account. The Directors call attention to the fact that the coal item is £38,940 higher than in the six months ending Dec. 31, 1899; but this has been met by an additional charge of 4d. per 1000 cubic feet for gas and the higher price obtained for coke, &c. The profit earned is sufficient to pay the usual dividend, and leave a sum of £1029 to be added to the balance carried forward.

CROYDON COMMERCIAL GAS COMPANY.

Half-Yearly Report and Accounts.

The report which the Directors of the Croydon Gas Company will present to the shareholders at their meeting on Friday opens with the gratifying statement that in the six months ending the 31st of December there was an increase of 4·53 per cent. in the quantity of gas sold, compared with the corresponding period of the year 1899. The Directors naturally regard this as satisfactory, considering the mildness of the weather, and the large augmentation recorded this time last year. The additional number of ordinary consumers during the half year was 280; and of prepayment and automatic consumers, 504—making the total number 16,001. There were 714 additional gas-stoves supplied on hire; making the total number 7755. As was foreshadowed in the previous report, the higher prices paid for coal, oil, and other materials caused a large increase of expenditure; and, after allowing for the additional revenue derived from the small advance of 2d. per 1000 cubic feet made in the price of gas from Michaelmas last, the amount of the profit made falls short by £7120 9s. 1d. of the sum required for the usual dividends. The Directors do not, however, propose for the present to further increase the price of gas, as they hope that the state of the markets will enable them shortly to purchase coal and other materials, for delivery after the completion of the existing contracts, at such reduced prices as will render an advance unnecessary. After providing for all fixed charges, the amount available for distribution is £18,932 11s. 11d.; and the Directors recommend that dividends (free of income-tax) be declared as follows: At the rate of 14 per cent. per annum on the consolidated "A" stock, of 11 per cent. per annum on the consolidated "B" stock, of 9 per cent. per annum on the consolidated "C" stock, and of 9 per cent. per annum on the "Carshalton capital" shares. The dividends and tax will amount to £16,221 9s., and leave a balance of £2711 2s. 11d. to be carried forward.

The accounts accompanying the report show that there was an expenditure of £11,298 for capital purposes in the second half of last year; bringing up the total outlay to £405,691, against £394,031 paid up. The revenue from the sale of gas was £52,363; rental of meters, stoves, and fittings came to £3897; residuals produced £19,768; and the total receipts were £76,106. The expenses connected with manufacture were £51,425; with distribution, £6777; and with management, £2375—the total being £66,157, leaving a balance of £9949 to go to the net revenue account. The statements relating to the manufacturing operations of the Company show that, under the direction of Mr. James W. Helps, M.Inst.C.E., the Company's Engineer and Manager, 27,579 tons of ordinary coal, 10 tons of cannel, and 299,175 gallons of oil were used for the production of 403,006,000 cubic feet of gas, of which 363,652,200 cubic feet were sold and 368,371,400 cubic feet accounted for. The estimated quantities of residual products were: Coke, 16,553 tons; breeze, 3719 tons; tar, 346,242 gallons; ammoniacal liquor, 720,653 gallons—the sulphate made being 270 tons.

TOTTENHAM AND EDMONTON GAS COMPANY.

Half-Yearly Report and Accounts.

In view of the half-yearly meeting of the above-named Company next Saturday, the report and accounts for the six months ending the 31st of December last have been issued. They show that there was an increase of 38,821,300 cubic feet in the sale of gas, or 13·07 per cent., as compared with the corresponding period of the previous year. The profit earned was, of course, injuriously affected by the high price of coal; and though there has already been a considerable fall from the rates paid last year, no advantage on this account will accrue to the Company till after June next. The sale of 335,768,200 cubic feet of gas for public and private lighting brought in a revenue of £50,336; the rental of meters, stoves, and fittings was £3985; residuals produced £9309; and the total receipts were £63,686. The manufacture of gas cost £42,948 (coal figuring for £18,473, oil for £9867, and coke for £3347); distribution, £5911; management, £2007; and the total expenditure was £55,467. The balance carried to the profit and loss account is £8219; and the sum available for distribution is £8774, of which £2406 has been taken from the reserve fund. This enables the Directors to recommend the payment of a dividend, less income-tax, on the "A" consolidated stock at the rate of 6 per cent. per annum, and of 4½ per cent. per annum on the "B" consolidated stock. Under the supervision of the Company's Engineer and Manager (Mr. Arthur E. Broadberry), 16,421 tons of coal, 3 tons of cannel, and 529,099 gallons of enriching oils were employed in the production of 353,143,000 cubic feet of gas, of which 340,769,000 cubic feet are accounted for. The estimated quantities of residual products for the half year were: Coke, 9854 tons 8 cwt.; breeze, 2633¼ chaldrons; tar, 244,850 gallons; and ammoniacal liquor, 4562 butts—the production of sulphate being 120 tons 10 cwt.

BROMLEY GAS CONSUMERS' COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held last Thursday, at the Bell Hotel, Bromley—Mr. ALEXANDER DICKSON in the chair.

The SECRETARY (Mr. H. W. Amos) read the notice convening the meeting; and the report and accounts were taken as read.

The CHAIRMAN said it became his duty to move the adoption of the report. When the shareholders met in August last, he drew their attention to the difficulties with which the Directors were confronted in regard to the state of the coal market. He then assured the meeting that the Board fully recognized the special duty which rested upon them at that period both to the shareholders and to the consumers; and he ventured to say that he hoped time would show that the arrangements they had made would reasonably safeguard both interests. It would be remembered that a moderate addition of 4d. per 1000 cubic feet had been made to the price of gas; and the Directors trusted that they would be able to get through the emergency without further changes, unless the high price of coal were greatly prolonged. Now they had the accounts for the last half year before them, and were able to see what the result of the working of the first six months had been. In regard to the make of gas, there was an increase of 3 million cubic feet. There was also an increase of 13 millions in the preceding half year; so that they had for the whole year an increased make of 16 millions. In 1899, the increase was from 10 to 11 millions over 1898. Therefore, notwithstanding that the last two months of the past year were exceptionally bright and clear, and consequently calculated to reduce the consumption somewhat, on the whole they had made a better advance during 1900 than in the previous year. The production of gas per ton had been well maintained; and the reports of the Gas Examiner to the Local Authorities had certified that the gas had on all occasions been well above the standard. One other matter, he paused to refer to briefly—that was, the quantity of gas which appeared upon the return as unaccounted for. This was considerably more than it was at Midsummer; but it was less than at the corresponding time last year. Taken by itself, it was not an extraordinarily large quantity upon the make. But he might say this, that owing to their having to take certain of the meter readings rather earlier than usual, there was a margin of that quantity which would come into money during the current half year. Then turning to the revenue account, and comparing it with that for the corresponding half of last year, an increase of £2456 in the gas-rental was shown. Of this, however, £1850 came to them by reason of the advance of 4d. in the price of gas. On meter-rental they had an additional £53, on stoves and fittings £139, and on coke £1954; but sulphate of ammonia and breeze had yielded £196 less. The net increase of revenue was £4406. On the expenditure side of the account, they had an increase in the item of coal of £3857 for the half year. They had also an increase of £250 on repairs of meters, mains, stoves, and fittings on hire; of £85 on purifying materials, repairs of works and retorts, and salaries and wages; of £47 on the maintenance of the public lamps; and of only £54 in the management charges and legal and incidental expenses. There was also an increase of £211 for rates and taxes. In parentheses, he explained that this item would not appear in that proportion in future accounts, as the Directors were arranging to charge the proper income-tax to the accounts of each half year, so that there would be little variation in the future. The total increase on the expenditure side of the account was £4504, against which they had an increase on the income side of £4406. Therefore the net result of the account was a lesser advantage of only £98. When the totals of both sides of the account, and also the difficulty of forecasting the yield of sales, were taken into consideration, he thought it would be conceded that the result of the first six months' trading showed a close approximation to the estimate the Directors put before the shareholders at the time of their last meeting. For the whole year, coal had cost them £5800 more than in the preceding year. In their case, the price of gas was only increased at Midsummer; and towards the additional expenditure for coal, the Company had only asked their customers for £1850. The new rental, and the sales of coke and residuals, had fortunately furnished the difference; and the working expenses and the interest and dividend charges were just met within the small margin of £6. In framing the accounts before they arrived at this result, the proprietors would be glad to know, the Directors had applied just the same scale of deductions for depreciation in the matter of perishable plant that they had been in the habit of doing, so they had not in any way squeezed the accounts to get at this very near result. The Company commenced their contract year (he called it the contract year as running from June to June in the matter of coal) with a stock of 5600 tons, which they had purchased at a lower price before the rise. To equalize the cost over the whole year, they apportioned one moiety of the advantage they then had in hand to each of the six months of the year. Consequently, this half year stood with the charge for coal to come out at exactly the same as it had been during the last six months; and unless they were disappointed in the receipts for coke and other residuals, the result at the end of the current half year ought not to be greatly different. Some of the larger gas companies had raised their prices 5d., 6d., and 7d. per 1000 cubic feet; and yet they had found it necessary to take some very large deficiencies out of their reserves. Some had increased their price for public lighting; but they (the Bromley Company) had lighted the town, under their contract, at the rates that were fixed when coal was costing 6s. 6d. per ton, instead of 16s. to 18s. as last year. They could not, in fact, alter the price for public lighting; but, notwithstanding,

they had been able to get through the emergency without any very serious deficiency. This he thought would be an earnest to the shareholders that the Directors had endeavoured to grapple with the problem in a manner which should be satisfactory both to the shareholders and to the consumers. He thought it would be well that he should just recall the fact that, under the statutory sliding-scale, there were permissible dividends proportionate to the price charged for gas. In their case, with gas at 3s. 4d. per 1000 cubic feet, the rate they were entitled to divide over and above the standard dividend was 3½ per cent.; but it would be seen by the resolution which would be submitted, that the rate they were dividing was only 2 per cent. above the standard dividend. The Company were quite content to surrender this difference in favour of the consumers in such times as this, hoping that, when they were able to reduce the price again, they might so enlarge their business that, in the near future, they would be able to have the full benefit of the sliding-scale. As the shareholders would have seen already, the exaction of the inflated and harassing prices for coal, by crippling the trade of the country, had diminished the demand. The tendency of all prices now was downwards; and he thought it was probable they would have a very considerable reduction in the price of coal when they made their contracts for the new year. If that proved to be so, he believed he might say, both for himself and his colleagues, that their first care would be to relieve the consumers by reducing the price of gas to its old figure, or so far as circumstances would permit. He next referred to the acquisition by the Company of suitable premises for town offices and show-rooms, and then spoke of the resignation of one of the Directors (Mr. Janson), who, at 88 years of age, did not always find it convenient to get down to the meetings. In his stead, they had elected a very respected townsman, Mr. Hugh Wyatt.

The Deputy-Chairman (Mr. B. H. Latter) seconded the motion, which, after a little explanatory information on one or two points had been given to inquiring shareholders, was carried unanimously.

Dividends at the rate of 12 per cent. per annum upon the original 10 per cent. capital, and 9 per cent. upon the ordinary 7 per cent. capital (both subject to income-tax) were declared.

The retiring Directors (Messrs. S. J. Wilde and Hugh Wyatt) and the Auditor (Mr. A. S. Hicks) were next re-elected.

The Chairman here mentioned that the Company were about to lose the services, for a short time only he trusted, of the Deputy-Chairman (Mr. B. H. Latter), in consequence of his having responded to the call of duty in South Africa; and that a few minutes before the shareholders' meeting, they had proof of the deep feeling entertained for Mr. Latter on the part of the employees. When they heard that he was going to South Africa, they purchased a telemeter, and had just presented it to him. He was sure one and all hoped to see Mr. Latter back again shortly, occupying his seat at the Board.

A brief expression of appreciation on the part of Mr. Latter was followed by cordial votes of thanks being passed to the Chairman and Directors, and to the Engineer (Mr. W. W. Woodward) and Mr. H. W. Amos, the Secretary.

PROVINCIAL GAS AND WATER COMPANIES.

Gas Companies.

The half-yearly general meeting of the Airedale Gas Company was held on Monday last week, when the accounts presented showed that the net revenue from the sale of 35,553,300 cubic feet of gas amounted in the twelve months ending Dec. 31 to £5551, and from the sale of residuals to £1565. The total receipts were £7314; and the expenditure was £5859—leaving £1455 to be carried to the profit and loss account. This was much less than usual, owing to the cost of the opposition to the Bradford Corporation Bill, the whole of which had been charged to the revenue account. A sum of £800 had to be drawn from the reserve fund to make up deficiencies of dividends, for which £1725 was available; and the Directors recommended the payment of 5 and 3½ per cent. on the two classes of stock. This was agreed to. At the close of the ordinary business, an extraordinary general meeting was held to authorize the issue of 300 new shares of £10 each.

The Chairman of the Aldershot Gas and Water Company (Mr. A. F Wilson) told the shareholders, when presiding at the recent half-yearly meeting, that there had been an increase of £2126 in the revenue from the sale of gas (from £9553 to £11,679); while the sale of water had brought in £3619, against £3172, or £447 more. Altogether, they had received £21,888 for the past six months, which meant nearly £44,000 a year. The increase in the quantity of gas consumed during the half year in Aldershot had been 7⅞ per cent., and in Farnborough 25 per cent.; while the War Department had taken 10 per cent. more—the average increase on the total being 10·8 per cent., which meant a double quantity in five years. Mr. Wilson passed on to refer to the purchase of the undertaking of the York Town Gas Company and to the Company's relations with the Urban District Council in regard to their Bill. He expressed the willingness of the Directors to consider any matter in regard to which the ratepayers might feel aggrieved, and to do so with a "benevolent desire" to meet their wishes if they possibly could. The report, already noticed (*ante*, p. 285), was adopted, and the dividends recommended therein were declared. At the conclusion of the ordinary business, a special meeting was held at which sanction was given to the promotion of the Bill above referred to.

In the report to be presented at the meeting of the Bristol Gas Company next Thursday, the Directors state that though, in consequence of the great advance in the price of coal, the expenditure in the half year ending Dec. 31 was abnormally high, the increase in the sale of gas and the return from residuals were most satisfactory. The accounts show that the revenue from the former source was £107,962, compared with £103,103; and from the latter, £50,905, against £37,610. The total receipts amounted to £162,797; and the expenditure was £144,092—leaving a balance of £18,705 to go to the net revenue account. This time last year the receipts were shown to be £144,087; the expenditure was £111,637; and the balance £32,450. The amount standing to the credit of the profit and loss account is £55,618. This will allow the payment of the interest on the debenture stock (£4921), and the maximum dividend on the general capital stock (£25,237), and leave a balance of £25,460 to be carried forward. The Directors recommend a dividend at the rate of 5 per cent. per annum.

The ordinary general meeting of the Bromsgrove Gas Company was held on Monday last week—Mr. J. Green in the chair. The Directors reported that the working capacity of the undertaking had been materially raised by enlargements and improvements. The sale of gas showed a satisfactory increase; and it was found necessary to make an extension of mains to meet the extra demand. The amount expended on capital account during the past year was £1468. The accounts, including the sum brought forward, showed an available balance of £1638, with which it was proposed to pay a dividend of 7½ per cent. on the ordinary shares, and 5¼ per cent. on the "B" shares for the year, and a like amount on the new "B" shares for the half year, free of income-tax; carrying forward a balance of £423. In moving the adoption of the report, the Chairman reminded the shareholders that they were paying upwards of 50 per cent. more for coals than they did two years ago, and yet were charging 1d. per 1000 cubic feet less for gas. The cost of coals during the past twelve months had been more than £700 in excess of that of the previous year; but the consumers had only been called upon to contribute £172 towards this amount. In increasing the price of gas only 3d., they had perhaps erred on the side of the consumers rather than of the shareholders; but they were perfectly satisfied with the results. The report was adopted, and the dividends recommended were declared.

The half-yearly meeting of the Colchester Gas Company was held last Friday—Mr. C. Coleman (Chairman) presiding. The report of the Directors stated that the make of gas, when compared with the previous year, showed an increase of 4·2 per cent. This they considered very satisfactory. During the past year, which was an exceptionally trying one to gas companies, the Directors had been obliged to raise the charge for gas in consequence of the high price of coal. From the present state of the market, however, it appeared that the exorbitant prices charged could not be maintained; and the Directors had consequently resolved to make a reduction of 6d. per 1000 cubic feet in the price of gas. The payment of the usual dividends was recommended. The accounts showed a balance of £2294. The report was adopted; and dividends for the half year were declared at the rates of 10 and 7 per cent. per annum on the old and new shares respectively.

The annual report of the Elland Gas Company shows profits, including the balance brought forward, of £6223. An interim dividend at the rate of 12s. per share was paid, absorbing, with the dividends on the preference shares and interest on the loan capital for the year, £2453, and leaving a balance of £3769 now available for dividend. The Directors recommend a dividend of 14s. per share upon the ordinary capital for the past half year; making 13 per cent. for the year.

In their report for the past year, the Directors of the Ipswich Gas Company express their gratification at being able to announce a large increase in the sale of gas. The extra business done has not, unfortunately, resulted in a corresponding additional profit; on the contrary, owing to the enormous and almost unprecedented rise in the price of coal, it is less than in the previous year. It is, however, sufficient to pay the statutory rates of dividend, and leave a rather higher balance to carry forward. The Directors, consequently, recommend dividends at the full statutory rates on all classes of stock. A new 18-inch main to the west end of the town was finished and brought into use at the end of the year; and it has materially improved the supply of gas to that district. The Directors have entered into contracts with Messrs. Sir W. G. Armstrong, Whitworth, and Co., Limited, to supply and erect new and more powerful hydraulic cranes, to accelerate the despatch and minimize the cost of discharging the Company's coal from the steamers; and with the New Conveyor Company, of Smethwick, for coal-conveying plant to carry the coal from the vessels to the stores. The accounts accompanying the report show a total revenue of £60,625, against £54,064 in 1899; and an expenditure of £49,389, instead of £41,841—the balances being respectively £11,236 and £12,223. Coal last year cost £28,447; whereas in 1899 it cost £19,299.

The annual report of the Newcastle-upon-Tyne and Gateshead Gas Company sets forth that in the twelve months ending Dec. 31 the revenue was £383,683, and the expenditure £291,481; leaving a balance of £92,202. The amount at the disposal of the Directors is £95,358; and they recommend that, in addition to the interim dividends at the rates of 5 and 9¾ per cent. per annum for the half year ending June, further dividends at the rates of 5 and 8½ per cent. per annum be paid for the six months ending Dec. 31. These will amount to £74,709; leaving a balance of £21,649 to be carried forward. A very considerable increase in the contract prices of coal for the year commencing in July necessitated a rise of 3d. per 1000 cubic feet in the price of gas, and a consequent decrease of ¾ per cent. in the dividend from the same date. The lower rates of the contracts for the first half year, a largely increased consumption of gas, and better prices for residuals, somewhat modified the effect of the extra cost of coal. The Directors point out that the coal market, fortunately, is now easier; and though the higher rates of the contracts expiring in June next have to be met, the prospect of cheaper coal in the second half of the current year, together with the surplus profits carried forward from last year, enable them to reduce the price of gas 1d. per 1000 feet from the commencement of the current quarter. The laying of large mains to the outlying districts, the introduction of machinery for the more economical carrying on of the works, automatic meters, and the extension of the issue of cooking-stoves, &c., are having careful attention from the Directors. It is expected that the new gasholder at St. Anthony's will be ready for use next winter.

The half-yearly report of the Rochester, Chatham, and Strood Gas Company was recently submitted to the shareholders. It showed the past half year to have been the least satisfactory in the annals of the Company, which was accounted for by the abnormal increase in the price of coal, alluded to in the previous report. Notwithstanding this, the balance to the credit of the profit and loss account allowed of the payment of the usual dividends at the rate of 10 per cent. per annum on the "A" and "D" shares, and of 7 per cent. per annum on the "B" and "C" shares. The revenue account for the six months ending Dec. 31 showed a total expenditure of £38,606; the receipts amounting to £39,275. The balance was therefore £669. The report and accounts were unanimously adopted.

At the half-yearly meeting of the Scarborough Gas Company, last Saturday, the Directors reported that the statement of accounts for the six months ending Dec. 31 showed, when all interest charges, &c., had been deducted, a net revenue of £8015. After providing for dividends on the preference stock, the Directors recommended the payment of maximum dividends on all the other stocks of the Company, less income-tax. This will absorb the sum of £6377, and leave a balance of £1638 to be carried forward. It was stated that, notwithstanding the mildness of the season, the demand for gas had shown a satisfactory increase, especially by consumers on the prepayment meter system. The returns from coke and other residual products during the half year had also been satisfactory. The work on the sulphate of ammonia and Claus sulphur-recovery plants referred to in the previous report was nearing completion, and the plants would be in operation during the current six months. The revenue from the sale of 139,212,100 cubic feet of gas to private consumers in the half year produced £19,535, and that derived from the public lighting (£2169) made up a sum of £21,704; residuals produced £4859; and the total receipts were £27,921. The expenditure on manufacture was £13,911; on distribution, £1678; and on management, £932—the total outlay being £18,064, which left £9857 to be carried to the profit and loss account. Under the supervision of the Engineer and Secretary (Mr. John Holliday), 10,570 tons of coal and 117,164 gallons of oil were employed in the production of gas; the estimated quantities of residuals yielded being: Coke, 6342 tons; tar, 737 tons; and ammoniacal liquor, 935 tons.

Addressing the shareholders at the annual meeting of the Sleaford Gas Company, the Chairman (Mr. H. A. Peake) made the interesting announcement that, despite the high prices of coal, it was hoped to further decrease the price of gas, which now stood at 3s. 4d. per 1000 cubic feet. During the year, £975 had been spent upon new mains, coal-waggons, meters, &c. A dividend of 9 per cent. was proposed, and the setting aside of £500 to form a reserve fund. The report was adopted.

The half-yearly meeting of the Wakefield Gas Company was, as usual, held in private; but, according to notices in the Press, the Chairman (Mr. W. A. Statter), in the course of his remarks, stated that he could not, as on previous occasions, say they had earned the dividend, owing to the heavy expenditure in introducing the inclined system of retorts and the high price of coal. The capital account had been overdrawn to the extent of £8212. It was to meet this, and further capital outlay which would have to be made in the current half year, that the Directors had decided to make the remaining calls upon the last issue of the new £10 shares (£5 paid). The customary dividends of 11½, 9, and 8½ per cent. per annum were passed.

The annual report of the Directors of the Walker and Wallsend Union Gas Company sets forth that the revenue of the gas undertaking is £30,979, and the expenditure £25,440; leaving a balance of £5539 as the profit for the year. The amount of undivided profits is £3463, and the profits for 1900 are £5539; making a total of £9002, which the Directors propose to appropriate as follows: Interest on mortgages, reserves, &c., £713; to the credit of depreciation fund, £500; intermediate dividend of £4 12s. 6d. per cent., less income-tax, paid in August last, £2291; to payment of second half-year's dividend, at £4 2s. 6d. per cent., less income-tax, £2026—leaving a balance to be carried forward to next year's account of £3472. As compared with last year, there is an increase in the receipts of £7505, and in the expenditure of £7600. The extended consumption of gas still continues, and, but for the great rise in the price of coal, a very favourable result would have ensued both for stockholders and consumers. The charge for gas was advanced 4d. per 1000 cubic feet last half year, with a corresponding reduction of dividend from £4 12s. 6d. to £4 2s. 6d. per cent. The Directors hope to obtain coals during the ensuing year under more favourable conditions, with corresponding results. The increase in the receipts from the sale of residuals is very satisfactory. Agreeably with last year's report, the further development of plant has had careful attention. At the Willington Quay works, the new retort-house with hand stoking machinery has been extended, and new scrubbers and new offices erected. At the Walker works, the storage capacity is being increased by the erection of a large three-lift gasholder in place of a small one now obsolete. The economical anticipations from the improved apparatus have been fully realized. The Company's Electricity Act for additional capital received the Royal Assent on the 30th of July. Acting upon the resolution passed at the special meeting on the 9th of November, the Directors on the 22nd of November issued a prospectus offering for public subscription 4800 ordinary electricity shares of £10 each at a premium of £2 10s. per share. The generating station at Neptune Road, Wallsend, is practically completed, and cables laid. The Company are now supplying current for lighting and power in Wallsend and Willington Quay. In pursuance of the special meeting held on the 10th of July, the agreement with the Newcastle Electric Supply Company, Limited, was completed on the 14th of August, and is now in operation under the Joint Committee of Management.

The quantity of gas sold by the Wellingborough Gas Company in the six months ending the 31st of December was 11 per cent. more than in the corresponding period of the previous year; and 366 additional meters were in use. The great advance in the cost of coal seriously affected the profits; but the Directors state, in the report they will present to the proprietors next Monday, that they intend to adhere to their determination not to raise the price of gas unless they are absolutely compelled to do so, but to use every endeavour to recoup the diminution of profits by extension of business. The larger demand for gas cooking-stoves will, they say, be a great help in this direction. The Company had 750 out on hire at the close of the year; and 59 were fixed during the past month. The accounts accompanying the report show that the revenue was £11,139, and the expenditure £9436; leaving a balance of £1703. The amount available for distribution is £3978; and the Directors will recommend a dividend of 6 per cent. on the "A" and "B" shares, and of 4½ per cent. on the "C" shares (income-tax paid), for the half year.

The half-yearly general meeting of the Westhoughton Gas Company was held on the 7th inst.—Mr. W. C. Buckley in the chair. The accounts presented showed that in the six months ending Dec. 31 the total receipts were £2707, and the expenses £2006; leaving a balance of £701. After allowing for payment of the interest on the loan, there was a balance sufficient to permit of a dividend at the rate of 5½ per cent. per annum, free of income-tax. (A similar dividend was paid for the two previous half years.) The Directors' report and the accounts were adopted, and the dividend ordered to be paid. It was resolved to raise £5000 of additional capital, to defray the cost of important contemplated extensions at the works. Votes of thanks to the veteran Chairman, who has occupied the position for a great number of years, and to the Directors and officers, were passed; congratulatory references being made to the continued success and hopeful prospects of the Company, the Secretary and Manager of which is Mr. John Hilton.

The profit realized by the Weymouth Gas Company in the half year ending Dec. 31 was £328 short of the amount required to pay the maximum dividend upon the ordinary stock and the interest upon the loan capital. This was caused by the abnormally high price of coal, which necessitated the expenditure of nearly £1000 extra, irrespective of the cost of the additional quantity used. The outlay for coal in the six months covered by the report was £1614 more than that for the corresponding period of 1899. There was a good market for coke, and the increased price obtained for this product, in conjunction with the larger gas-rental, compensated to an extent for the greater cost of coal. There was an increase of more than 8 per cent. in the sale of gas, as compared with the second half of the previous year; the augmentation for the year being 7½ per cent. The Directors did not advance the price of gas. The accounts to be presented at the ordinary general meeting next Thursday show that the total revenue was £9830; and the expenditure, £7910—leaving £1920 to be carried to the net revenue account. The balance available for distribution is £3983; and the Directors will recommend the declaration of a dividend at the rate of 5 per cent. per annum on the ordinary stock, less income-tax.

At the recent half-yearly meeting of the Willenhall Gas Company, the revenue account presented showed a balance of £2651, and the payment of the usual dividends on the several classes of shares absorbed £1428; leaving £1223 to be carried forward. It was stated that the demand for gas during the past year had increased by more than 8 per cent.; and that the new retort-house, rendered necessary by the steadily growing business, was nearly completed.

Mr. William King presided at the half-yearly meeting of the Yeadon and Guiseley Gas Company last Wednesday. The Directors' report set forth that the total earnings for the six months ending Dec. 31 amounted to £7012, and the expenditure to £5598; leaving a balance of £1414 available for distribution. The payment of the usual dividends of 10 and 7 per cent. per annum would absorb £1272, and leave a balance of £142 to be carried forward. The report was adopted.

Water Companies.

A satisfactory increase of revenue was reported at the half-yearly meeting of the Brompton, Chatham, and Gillingham Water Company. The prospects were also reported to be good—362 new services having been connected, making the total number of consumers on the books 19,084. Dividends at the rates of 10 and 7 per cent. per annum were declared; and a balance of £1013 remains to be carried forward.

The report of the Directors of the Colne Valley Water Company (which was noticed in the "JOURNAL" last week, p. 423) was presented at the half-yearly meeting of the shareholders last Tuesday. Mr. J. R. Hollond, who presided, said he was glad to be able to give as usual a good account of the position of the Company; the business generally having increased very considerably. The water-rates for the half year amounted to £12,327, as compared with £11,534 in the corresponding period of 1899, or an increase of £793. If he added to this the increase in the half year to June 30 (£1109), they had a total advance for the year of £1902. Up to June 30, the number of new supplies was 330, estimated to yield an income of £806 per annum. Since June, 411 new supplies had been laid on, which were estimated to yield £1103—making for the whole year 741 new supplies, and the estimated income £1909. This was considerably more than in any previous year. Ten years ago, the total number of new supplies laid on in the year was 240, representing a total rental of £500; so that the estimate of the increase from last year's new supplies was four times larger. Passing over other items of income, he said the total expenditure for 1900 was £10,195, which was £1693 more than in 1899. This was a larger increase than usual, and was caused by the higher price and greater consumption of engine fuel, and the advance in rates and taxes—the latter alone being £517 more than in 1899. The total consumption of water in 1900 was 602 million gallons—an increase of 75 millions. It was proposed to raise the dividend from 6 to 6½ per cent. In 1890, the dividend was 2½ per cent., so that they had had an increase of 4 per cent. in ten years. To augment the supply of water, it was proposed to erect a new beam engine, and sink a new well and headings; and, among other work, the completion of the 24-inch pumping-main was contemplated. To provide the money for these new works, the Directors proposed to issue 1800 new £10 shares. As these were quoted at £18 10s. to £19 10s., the issue should realize sufficient to meet requirements. Mr. C. E. Keyser seconded the motion, after which three shareholders offered advice to the Board. One desired to see an independent pumping-station rather than an extension at, and in proximity to, the present one; another desired the new shares should be issued at par to the shareholders; and a third advised the Board to get the consumers financially interested in the Company. After considerable discussion, the report and accounts were adopted; and the remainder of the business was transacted.

At the meeting of the East Worcestershire Water-Works Company, on the 28th inst., the Directors will report that during the half year ended the 31st of December, 125 additional services were laid on; making the total 5574, exclusive of Droitwich and Rednal. The average consumption of water was 786,023 gallons daily. Mr. E. B. Marten, M.Inst.C.E., reports that the second borehole at the new pumping-station is nearly completed to the required depth of 300 feet, and it promises a good supply of water. There have been allotted 44 additional shares, at the prescribed premium of £2 10s. each; making the total share capital to date £66,590. The premium (£110) is added to the reserve fund. The usual half-yearly accounts which accompany the report show that there has been an expenditure on capital account of £3700, a portion of which is for extensions of mains in the Redditch

district, and the remainder of it is the cost of well-boring and new pumping plant. The revenue account furnishes indications that further steady progress is made in the water-rents. On the other hand, there is a considerable increase in the charges for maintenance, chiefly caused by the extra cost of coal, and some necessary repairs to the Burcot reservoir. The profit shown is £1753, to which has to be added £989 brought forward; making a disposable amount of £2742. It is proposed to pay a dividend for the half year at the rate of 4 per cent. per annum, free of income-tax, amounting to £1327; carrying forward £1415.

At the recent half-yearly meeting of the Frimley and Farnborough District Water Company, the report presented showed a sum of £1591 available for distribution. Out of this the Directors recommended the proprietors to declare a dividend at the rate of 5 per cent. per annum, carrying forward £570. During the half year, 206 houses and twelve meter connections were made, as well as others with two military camps; and the service mains were extended about 8 miles. The working expenses were higher, chiefly owing to the increased cost of coal and the rate of wages. The report was adopted. The Directors were subsequently authorized to issue the £3750 of debenture capital sanctioned by the Wey Valley, Frimley, and Farnham Water Act, 1898; and the shareholders approved of the Provisional Order which has been applied for to enable the Company to raise further capital to the amount of £20,000, and to purchase additional land.

The following is the report of the Directors of the South Staffordshire Water-Works Company, to be submitted at the half-yearly meeting on the 28th inst.: The number of houses laid on during the half year was 2519, making the total supplied 108,660. The gross amount of water-rates was £55,437, as against £54,228 in the corresponding period of the previous year. After providing for interest on the debenture stock and preference stock, the amount remaining for division (including £7701, the balance brought forward) is £22,108; and the Directors recommend the declaration of a dividend on the ordinary stock at the rate of 5½ per cent. per annum, free of income-tax. The amount of this dividend being £16,362, there will remain £5746 to the credit of the next half year. The report of the Engineer (Mr. H. Ashton Hill, M.Inst.C.E.) as to the condition of the Company's works is appended to the Directors' report. He states that the whole of the pumping machinery and buildings are in substantial order and repair.

The annual meeting of the Southport Water Company was held on the 9th inst.—Mr. C. T. Part presiding. The adoption of the report and the declaration of a dividend at the rate of 9 per cent. on the original and "A" shares, and of 7 per cent. on the remainder of the paid-up capital, having been proposed, questions were asked relative to the Company's Act empowering them to raise additional capital to carry out extensions, and to the suggested purchase of the undertaking by a Joint Board of the Southport Corporation, the Birkdale Urban District Council, and the West Lancashire Rural District Council. In reply, it was stated that, as an outcome of the opposition offered to the Company's Bill last session, a clause was inserted to the effect that any addition to their capital charges was not to be taken as enhancing the value of the concern in case a Bill should be promoted in the present session for the compulsory purchase of the undertaking by the bodies named. The Directors had not so far issued any of the new capital, and they had not been approached in regard to the suggested purchase. The report was adopted.

The annual report of the Directors of the Sunderland and South Shields Water Company shows that while the revenue for water-rents last year increased, the extra cost of coal more than absorbed the difference. For the six months ended Dec. 31, the Directors recommend a dividend of 4¼ per cent. on the ordinary and preference stocks, of £3 3s. per cent. on the additional capital stock, and of 2¼ per cent. on the new (5 per cent. maximum) stock; making, with the interim dividend, 9 per cent., £6 6s. per cent., and 4½ per cent. for the year.

Meeting at Darlington, the shareholders of the Weardale and Shildon Water Company adopted the annual report, which stated that the net revenue amounted to £50,073, including £11,194 brought forward. The average dividend for the year was 5½ per cent.; and the undivided profit was £11,749. The Chairman (Sir D. Dale) mentioned that the capital of the Company was represented by 24,000 £25 fully-paid shares, amounting to £600,000—the sum received in premiums being £27,667. The amount of mortgage still remaining was £12,820, the greater part at 3 per cent., and smaller sums at 3½ and 2¾. In connection with the Tunstall filter-beds other loans would have to be raised, or those existing renewed. The Tunstall work would cost £16,000; and coal rights at the Mount Pleasant reservoir had been purchased.

DEVONPORT GAS-WORKS PURCHASE SCHEME.

Meeting of the Ratepayers.

A Statutory Meeting of Owners and Ratepayers of Devonport was held last Thursday evening to consider the question of the proposed purchase of the gas-works by the Corporation. The MAYOR (Mr. H. J. Harman Graves) presided over a large attendance. Handbills had been distributed by the promoters of the scheme, urging the ratepayers to attend and vote for it, in order that the profits from the gas-works might be applied in relief of the rates.

The MAYOR moved a resolution in favour of the promotion of the Corporation Bill. He said there was no desire on the part of the Town Council to deprive the owners of the gas-works of any of the value they had in the undertaking. There were many arguments in favour of purchase. The Gas Company were applying to Parliament for leave to increase their capital to £150,000, with borrowing powers, and to extend the field of their operations over the immense rural area recently added to the borough. It seemed to him that the community ought to have control of the gas supply, which would yield very great profit when the rural area was fully developed. Except that they would subscribe the capital, the Company would do nothing to earn the additional profit, which should go to the relief of the rates or the reduction of the price of gas. In face of the proposal, it would have been the duty of the Corporation to apply for power to purchase the undertaking, even if the management had been of the most faultless and unselfish kind. Investigation of the accounts so tardily supplied by the Company showed that the administration in the past had been neither economical nor businesslike. Since 1853 the Company had not applied to Parliament for any increase of capital, although that which was then granted was quite inadequate to keep pace with the great growth of the borough. The expenditure of large sums of money out of revenue for the extension of plant had been a manifest abuse, and was absolutely illegal. It was also illegal for the Directors to pay income-tax in addition to the 10 per cent. dividend. According to expert calculation, the profit on the gas-works last year was £8080. This was sufficient to pay the interest and sinking fund on £180,000. They ought to be able to save on the cost of manufacture from 1d. to 2d. per 1000 cubic feet, which would give them from £1000 to £2000 a year more.

Mr. W. HORNBROOK seconded the motion, and commented on the fact that no opposition was offered in the Council to the purchase scheme.

Alderman S. D. BROOMING was not opposed to the acquisition of the gas-works by the Corporation, but thought the Gas Committee should inform the ratepayers what was the limit to which they would go in the matter of price. If the gas-works were purchased, the ratepayers of to-day would have to make a certain sacrifice; and the question was whether this would be commensurate with the benefit which would be enjoyed by those who came after them. The present market price of the shares was £11 2s. 6d. Would the Company still resist purchase if Parliament gave them £16? At such a price the ratepayers would derive no advantage; the Company would get the benefit.

Mr. D. D. SHEPHERD contended that the refusal of the Company to light the added district except upon the condition of the Corporation laying the mains was a sufficient reason for the Corporation taking steps to acquire the gas-works. With regard to the suggestion that the Gas Committee should name the price they were prepared to give, the danger was that the Company would take this as a minimum, and insist upon having it. It was only by acquiring revenue-earning properties like the gas-works that they could hope to reduce the rates.

Mr. H. BANBURY, a member of the Corporation, opposed the purchase. He referred to the case of other gas-works owned by municipalities, and pointed out that circumstances so differed that it was impossible to draw the conclusion which the Council invited them to do, that municipal ownership was invariably best for the community. The price which now had to be paid for gas undertakings was very large, and some local authorities who had purchased them did very badly.

Mr. J. C. TOZER contended that since the Company's Act was passed in 1853 the privileges granted to them had been abused, and in the past thirty years £18,000 had been lost to the consumers.

Mr. A. BENNEE, the Chairman of the Company, protested against this accusation, which he said was an abuse of language. The Company had been grossly vilified and misrepresented.

Mr. TOZER, continuing, contended that the Company had no right to increase the price of gas last year. The capital should be at least £600 per million feet of gas sold, but it was only half that.

Mr. BENNEE: So much the better for the consumers.

Mr. TOZER denied this, for the consumers had been paying for plant for which the Company should have raised capital.

Several other speakers followed on the same side.

Mr. T. H. GILL said that, though he was a shareholder in the Company, he desired only the best interests of the ratepayers. On the basis of the market price of the shares, he estimated the value of the undertaking at £118,000, and said that if the town were going to buy at all, this was the time. If the Company obtained their Bill, they would be in a position to raise their capital to £240,000; and the Corporation would not then be able to touch them.

The TOWN CLERK (Mr. A. B. Pilling) advised the ratepayers in the added district to vote for the purchase of the gas-works if they wanted a supply of gas. The Gas Company were asking Parliament to grant them a monopoly of the supply of gas in the district; but they did not put a word in their Bill which would compel them to furnish such supply. With regard to the price to be paid to the Company, did they usually tell the vendor what they were prepared to give for anything they wanted to buy? The price would not be anything like £250,000. Both the Corporation and the Company asked for power to raise £100,000 for the extension of the works. If the Company spent this money, it would be under circumstances which would enable them to pay 12¾ per cent. upon the outlay. If the Corporation spent it, it would be in a way which would allow of the gas-works contributing to the relief of the rates. The value of gas-works was the authorized income which the shareholders drew from the property. The number of years' purchase varied from 22½ to 28. In the case of the Devonport Company, the authorized income was £3840; and if they took this at the outside price of 30 years' purchase, they only had a little over £100,000 to pay for the undertaking. Mr. Stevenson had advised the Corporation that it would prove, without exception, the cheapest and the most profitable purchase of any gas undertaking.

The motion was carried; but a poll was demanded.

Riparian Owners' Rights.—In the course of an action which recently came before Mr. Justice Byrne, the law applicable to riparian owners, as contrasted in the cases of natural and artificial watercourses, was thus stated, on the authority of a Privy Council case: "There is no doubt that the right to the water of a river flowing in a natural channel through a man's land and the right to water flowing to it through an artificial watercourse constructed on his neighbour's land do not rest on the same principle. In the former case, each successive riparian proprietor is, *primâ facie*, entitled to the unimpeded flow of the water in its natural course, and to its reasonable enjoyment as it passes through his land, as a natural incident to his ownership of it. In the latter, any right to the flow of the water must rest on some grant or arrangement, either proved or presumed, from or with the owners of the lands from which the water is artificially brought, or on some other legal origin." It may be concluded from this that a factory owner might obtain a prescriptive right to the water flowing past his mill in a millstream belonging to another millowner lower down.

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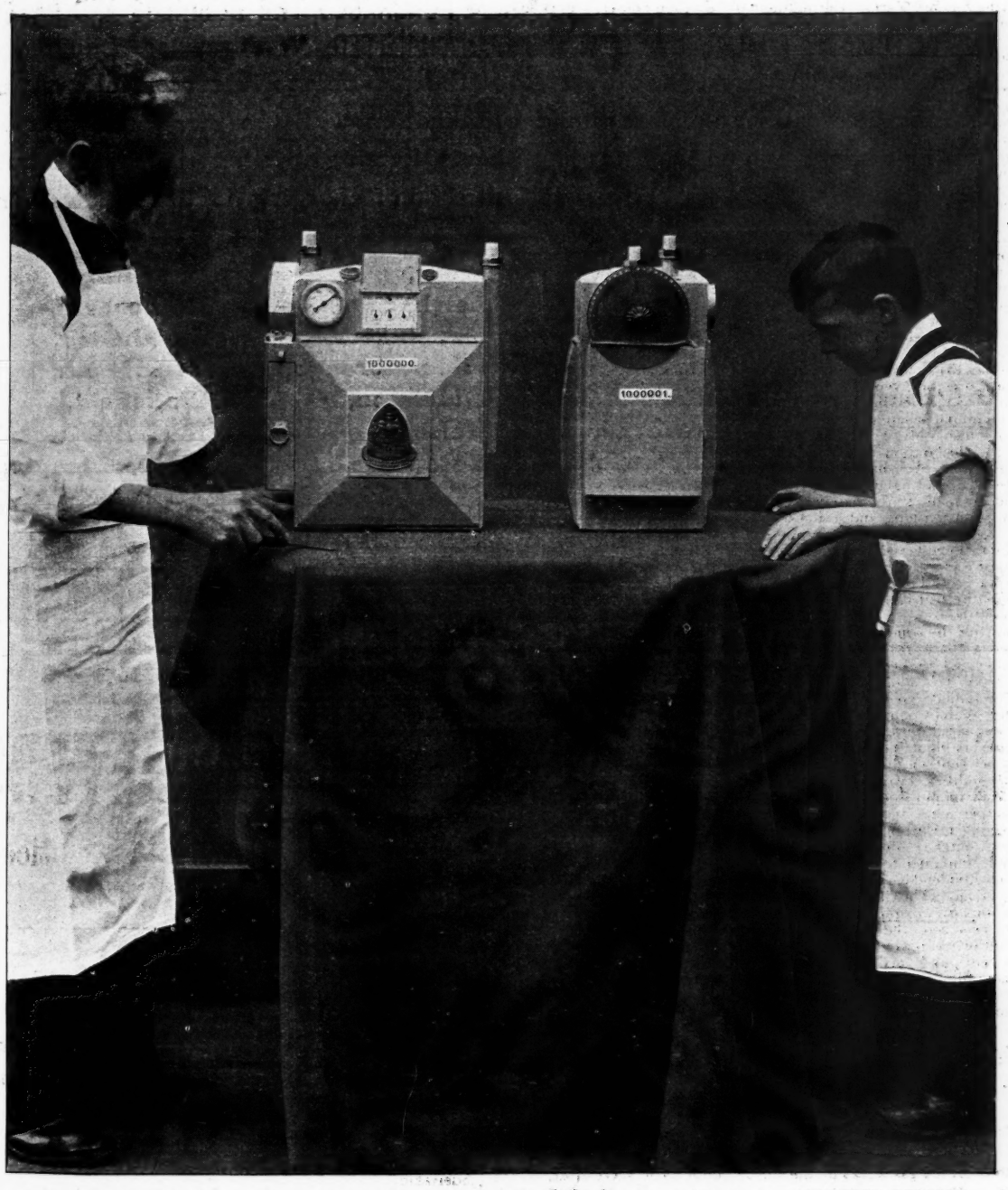

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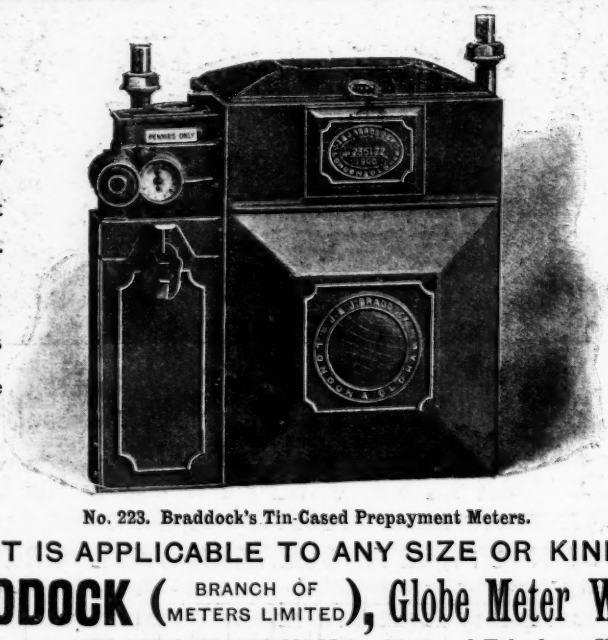

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GRAVESEND TOWN COUNCIL AND THE GAS COMPANY.

Opposition to the Company's Bill.

A short time ago, the Gravesend Town Council requested the Town Clerk (Mr. C. E. Hatten) to prepare a report on the Bill promoted by the Gravesend and Milton Gas Company. The objects of the Bill are: To convert and consolidate the existing capital, raise fresh capital, increase the standard price of gas from 2s. 10d. to 3s. 6d. per 1000 cubic feet, empower the Company to form an insurance fund as well as a reserve fund, extend the limits of supply to Chalk, reduce the quality of gas from 16 to 14 candles, and enlarge the Company's powers with regard to providing and fixing fittings for the supply and use of gas. The Town Clerk duly presented his report, in which he dealt fully with all the Company's proposals, and it was submitted to the Council in Committee, with the result that it was resolved to retain the services of a gas engineer to advise them, and a Committee was appointed to deal with the whole question. The Committee subsequently had a meeting and instructed the Town Clerk to retain the services of Mr. W. A. Valon, who was to prepare a full report upon the Bill. In due course, Mr. Valon made his report, and it was presented to the Committee. It embodied the results of his thorough examination of the Company's Acts and accounts and of the various matters connected with their proposed application to Parliament, as well as of his visit to the works; and he summed it up as follows: "The conversion of the present capital into stock, including as it does the sum of £8951 10s. 10d. premiums, must be rectified so as to cover fully paid-up capital only, and care should be taken to prevent the Company from turning into share capital any balance of borrowed money or any money that may be borrowed in the future. The capital asked for in the Bill is unreasonable—viz., £60,000, with one-third borrowing powers £20,000, together £80,000—and should be reduced by one-half; the Company having £11,079 0s. 6d. share and loan capital still to be expended. As the capital is to be converted into 5 per cent. stock, the amount to be set aside by the Company annually to an insurance fund should be limited to 1 per cent. The Company should undertake to make up their reserve fund to its proper amount by adding to it £1156 18s., which should be taken out of profits that might otherwise be divided among the shareholders. The abolition of the neutral-zone between 3s. 6d. and 2s. 10d. should be resisted. The reduction of the illuminating power from 16 to 14 candles should also be strenuously opposed, unless the Company at the same time are willing to give an equitable effect to the reduction by accepting the same modification as the South Metropolitan Company did last session, and agree to a reduction of the standard price from 3s. 6d. to 3s. 4d. and the neutral zone from 2s. 10d. to 2s. 8d." He advised the Corporation to oppose the Bill for the reasons set forth. The Gas Committee considered the report, and unanimously recommended the Council to follow Mr. Valon's advice. The matter came before the Council last Wednesday, when Alderman Fletcher criticized some of Mr. Valon's statements, and characterized the report as unfair. Eventually, however, the Committee's recommendation was adopted unanimously. The Town Clerk had been instructed to prepare a *précis* of his own and Mr. Valon's reports, and a summary statement of the grounds of the Council's opposition to the Bill. The *précis* was read and approved; and, in accordance with the directions of the Committee, a copy of it, as well as of the two reports, was sent to the Company.

LEIGH CORPORATION AND GOLBORNE GAS SUPPLY.

Charge for Gas in the Out-Districts—Opposition to the Golborne Gas Bill.

At the Meeting of the Leigh Town Council last Tuesday—the Mayor (Mr. G. Shaw) in the chair—the following recommendations from the Gas and Water Committee were under consideration: "(1) That the prices charged for gas within the borough be extended to the whole of the area within which the Corporation have statutory authority to supply gas; (2) that the Urban District Council of Golborne be informed that, provided they obtain the necessary statutory power to take gas in bulk from the Corporation of Leigh and supply it to consumers in Golborne, and on condition that all the gas used and supplied by them in Golborne is taken from the Leigh Corporation, and that the mains belonging to the Leigh Corporation in Golborne are paid for by the Urban District Council, the Corporation will supply gas in bulk to the Golborne Urban District Council at the rate of 2d. per 1000 cubic feet below the prices charged for the time being to ordinary consumers in the borough of Leigh; (3) that the Sub-Committee who had made an inspection of the Golborne Gas Company's works and investigated the accounts of the Company and submitted the valuation of the undertaking be authorized to negotiate for the purchase of the undertaking on the lowest possible terms."

Mr. Eckersley, in calling attention to the recommendations, said it was only about two months since the Gas Committee, after considerable discussion, came to the conclusion that they should offer to supply Golborne with gas at 3d. per 1000 cubic feet more than consumers in Leigh were charged. It was thought that by these terms they were offering a great inducement to consumers at Golborne; and now the Committee had turned round completely, and had offered to supply Golborne on the same terms as Leigh. This was a great injustice, because the consumers in Leigh had had to find the £100,000 which had been sunk in the gas-works. He had made inquiries, and found that in no other place in Lancashire did a borough supply outside districts at the same rate as their own ratepayers. He therefore moved an amendment that the minutes be referred back, and that the Council adhere to their original resolution to charge 3d. per 1000 cubic feet more to Golborne than to the Leigh ratepayers.

Mr. Harrison, in seconding the amendment, said he thought, from a business point of view, they were going in the wrong direction. The proposed reduction in the price of gas was an attempt to coerce the Golborne Gas Company. Lowton, another outside district, was being charged 3d. per 1000 feet more than Leigh, and yet it was suggested to put Golborne on the same footing as Leigh.

Mr. J. H. Smith asked if the reduction would place the Golborne Council on the same footing as ordinary consumers in Leigh, who paid 3s. per 1000 cubic feet, less a discount of 3d. in the case of small consumers and 5d. in the case of large consumers.

The Town Clerk (Mr. P. Thomas) said the price suggested was 2d. per 1000 cubic feet below that charged to ordinary consumers in Leigh, or 2s. 7d.

Alderman Cowburn, speaking as the Chairman of the Gas Committee, said if the resolution was not carried Leigh would be cut off from a large source of revenue which they had not yet touched. No injustice would be done to Leigh by charging Golborne as suggested. It was of vital importance that the resolution should pass, and anybody who voted against it would be going against the success of Leigh and of the gas-works of the Corporation. The custom in past years had been to levy blackmail, so to speak, on the outside districts. The time for this had gone past, and he did not care where their gas went if people were only willing to pay them a fair price for it. The extension of the area of their gas supply would conduce to the prosperity of the gas-works.

The amendment was lost by a large majority, and the minutes were approved. It was then agreed that the seal of the Council be affixed to a petition against the Golborne Gas Bill of the present session.

Alderman Cowburn, in moving—"That a Committee, not exceeding three in number, be appointed, with power to deal with the questions of supplying gas to Golborne and the opposition to the Golborne Gas Bill, 1901," said there would be a good many delicate negotiations over this matter, and the full Gas Committee would be too cumbersome to do the work.

Mr. S. Brydell seconded the motion.

Mr. Harrison said he had no wish to stultify the efforts of the Committee, but he must say he did not feel proud of the action the Council had taken in the matter. Three months ago there were not ten men on the Corporation who knew they had the right to supply Golborne with gas. It was going to cost a lot of money to fight the Gas Company, and he would like the Chairman to say if there was any possibility of the Council being successful. He entered his protest at the manner in which that business had been negotiated.

Mr. Harrison said the question of supplying gas to Golborne had been in abeyance 29 years, and, from a commercial and moral aspect, the action of the Leigh Council was not one which redounded to their credit.

Mr. Eckersley thought the Council would make a mistake if they went on with the opposition. The game was not worth the candle.

Alderman Cowburn, replying as Chairman of the Gas Committee, said he was surprised at the opposition, for everybody could see that it was absolutely necessary to appoint the Sub-Committee suggested. Some 27 years ago the old Leigh Gas Company's undertaking was purchased for £48,000, and at that time the Local Authority secured the right to supply Golborne with gas. The Golborne Gas Company had no right whatever to do so, but they had been poaching on Leigh's preserves all these years; and yet Mr. Harrison advised the Council to sit down and let the Company have all their own way.

The motion was carried by a large majority; and the Mayor, Alderman Greenough, and Alderman Cowburn were appointed the Sub-Committee, who will have full power to settle with the Company without going back to the Council for authority to do so.

ST. MARY CHURCH GAS-WORKS PROPOSED EXTENSION.

An inquiry was held at Torquay last Tuesday, by Colonel A. G. Durnford, one of the Inspectors of the Local Government Board, respecting an application by the Corporation for permission to borrow the sum of £10,000 for the enlargement of the St. Mary Church Gas-Works, which, owing to the extension of the borough boundaries, have now come under the control of the Corporation. The Town Clerk (Mr. F. S. Hex) explained that the late Local Board for St. Mary Church obtained in 1868 a Provisional Order authorizing them to raise on loan £15,000 for gas-works purposes. They had borrowed £14,708, of which £6305 had been repaid, and there was a sum of £2102 standing to the credit of the sinking fund. Of the £10,000 which it was now proposed to borrow, £3000 would be spent on the improvement of the plant, £1500 on gasholders, £1500 on generator furnaces, £500 for gas-meters, £2000 on the extension of mains, and £1500 on automatic meters and the development of the hiring system. Mr. H. A. Willey, of Exeter, said the present works comprised three benches of six and one bench of three retorts. The purifiers were very defective, and the exhausting machinery liable to break down at any moment. Though in good condition, the condensers and scrubbers were inadequate to treat economically and efficiently the volume of gas made. There were two gasholders, which were too small; and the mains were inadequate. Last year 22 million cubic feet of gas were produced; but, as the normal capacity of the works was only 16 millions, this was only done by the incessant watchfulness and perseverance of the Manager. He (Mr. Willey) was of opinion that provision should be made for an output of 36 million cubic feet. For this purpose, he proposed to convert the existing retort-benches into modern generator settings. Coal-stores would be erected, a new combined engine and exhauster put in, and additional holders provided. In the district a general enlargement of the mains was necessary to meet the augmented demand which had arisen for gas. Mr. W. F. Greenslade, Chairman of the Gas Committee, also gave evidence in support of the application. He said that the charge for gas in the district was 4s. per 1000 cubic feet for lighting, and 3s. 6d. for heating. Mr. A. Iredale, a Director of the Torquay Gas Company, asked for an assurance that the undertaking was to be confined to the former St. Mary Church district. The Town Clerk said they did not seek to extend the area of supply. The application had reference only to the area contemplated by the Order of 1868, and was made as if no alteration in the boundary of the borough had taken place. Mr. Iredale expressed himself as perfectly satisfied.

WALSALL CORPORATION GAS SUPPLY.

The Past Year's Work.

At the Meeting of the Walsall Town Council on Monday last week, the Chairman of the Gas Committee (Mr. T. P. Brownhill) reviewed the past year's working of the gas undertaking, and said it was a matter for gratification that the position was much more satisfactory than was the case twelve months ago, when they were in a very bad way. The quantity of gas made had been 452,971,000 cubic feet, which was an increase of 29,197,000 cubic feet over the previous year. During the closing three or four months, the works were taxed to their utmost capacity. The Committee had spent £2919 in laying new mains and £1068 in alterations and repairs to mains; while there had been extensions of works paid for out of revenue amounting to £5476, whereas the average was only about £1600. The amount paid for rates and taxes had increased by £411, and was now £2976. The cost of coal was £41,838, against £30,478; while wages had increased by £2070—the total being £17,600. The value of gas sold was £54,939, an increase of £6940; coke sold represented £19,447, against £14,341; and tar and liquor, £6215, against £5211. Altogether, the increases in income amounted to £13,050, and the increases in expenditure to £13,429. The Committee had not anticipated that, under the special circumstances, actually there would be any profit; but it was £2449. This, however, would have to be utilized in repaying money which had been taken from the reserve fund. During the last seven years, the gas undertaking had contributed £29,500 to the rates; and the reserve fund had been raised to £14,000. They had to spend another £36,000 on the works; and when this was done, he believed the town would again receive great benefit from the gas-works.

PROPOSED RECONSTRUCTION OF THE RIO DE JANEIRO GAS COMPANY.

The Brussels correspondent of the "Financial News" wrote to that paper on the above subject last Thursday as follows: "A scheme has been set on foot to reconstruct the Rio de Janeiro Gas Company—or, rather, to supply to that concern the necessary funds to enable it to complete its gas installation, to which a new electric plant is to be added. Altogether, a fresh capital of 50,000,000 frs. is wanted, which amount, however, may eventually be increased, with the development of the concern in the course of its 45 years' duration, unless the concessions are redeemed in 1915. The following programme will shortly be submitted to the shareholders, and will immediately be carried out, if the negotiations with the Brazilian Government, in view of the transferring of the concessions to a new Company, should lead to a favourable result. In this case, a new Company is to be formed, with a capital of 15,000,000 frs., to which all the concessions now belonging to the Rio Gas Company, its works and plant, are to be transferred. In exchange, the present Company will receive, as long as the concession lasts, a share calculated on the following basis: In the first place, from the net profits of the enterprise there are to be deducted the necessary sums for interest payments and for redemption of the loans which the new Company will have to raise for fresh requirements. There will also be deducted an amount equal to that representing annual interest at the rate of 6 per cent., and the annual instalment of an amortization fund of 15,000,000 frs., with a premium of 20 per cent., and any other supplementary capital created in the course of the concession. Out of the balance the old Rio Gas Company will receive 75 per cent. as long as the capital is 15,000,000 frs., and from the following amounts, up to 40,000,000 frs., 1 per cent. is to be deducted per 1,000,000 frs. In the latter eventuality, the Company will benefit by 50 per cent., which will remain invariable, even if the capital of the new Company is again increased. According to the 'Moniteur,' a group of Belgian banks and Continental companies have declared their willingness to carry the operation through. The Syndicate includes the Société Générale of Belgium, the Banque d'Outremer, the Banque International, the Banque de Paris, the General Gas Company of France and Abroad, and others. Although the Syndicate will undertake to find the total amount of 15,000,000 frs., the present Rio Gas Company has an option in this operation up to 40 per cent."

ELECTRIC LIGHTING NOTES.

The Electric Lighting Committee of the Coventry City Council recently recommended the borrowing of £18,000 for extensions. The proposal was referred back because it was considered a larger scheme would obviate another early appeal to the Council. The Committee have now decided on a scheme which is estimated to cost £23,200.

A portion of Grimsby was illuminated for the first time with the Corporation's electric light on Monday evening last week. There are twenty arc lamps ready, and the current was switched on to these experimentally. The whole of the installation is nearly completed. The total sum authorized to be spent upon the works is £55,000; and they were commenced on Oct. 5, 1899.

After a long interval, the subject of electric lighting is again receiving the consideration of the Penzance Town Council. A report on the proposed installation was read at a meeting of that body on Wednesday last. The suggested expenditure of nearly £30,000 appears, however, to have staggered the members; and it was decided to defer the discussion of it until the report has been printed and circulated.

The defeat of the proposed combined electric lighting scheme for the parishes of Wood Green, Tottenham, Enfield, Edmonton, and Southgate, to which reference has already been made in our "Notes," appears to be certain. In two places the measure has been rejected; the polls taken last Tuesday having produced 2734 votes against and 1691 for at Enfield, and 1597 against and 1027 for at Edmonton. Meetings have not yet been held at Wood Green and Tottenham; and at Southgate there will be no poll.

At a special meeting of the Dublin Corporation on Monday last week, the Lord Mayor said he was quite sure there had been, and still was, a general feeling existing with regard to the electric lighting question, and the position it at present occupied with reference to the Local Government Board; and he desired to say that they had received a letter from the Board giving their absolute sanction to the £254,000 loan which had been applied for by the Council. With a view to assist the Corporation, the Board said they would be pleased to grant this amount in sums of £50,000, as required, during the contract.

So satisfactory was the result of last year's trading, that the Taunton Electric Lighting Committee have resolved to reduce the charges to the consumers. The balance-sheet shows that the gross profit amounted to £2965, or some 6¼ per cent. on the capital employed. After paying the charges for interest and sinking fund, there was a balance of £800. The Committee recommended that £750 should be placed to the reserve fund, and the balance carried to the next account. When the matter came before the Council, Alderman W. Potter, Chairman of the Committee, said they were willing to contribute £300 to the relief of the rates, as they did last year; and it was thereupon decided that this should be done and £450 only added to the reserve fund. It is proposed to spend £17,780 on the further extension of the plant.

In the "JOURNAL" last week we reported that, after a "record" sitting (it lasted from 10 till 2.35), the Gravesend Town Council had decided to carry out an electric lighting scheme which will involve an outlay of about £30,000. The scheme has been prepared by Mr. W. H. Trentham, and the resolution adopting it was carried by nine votes to six. The decision is not, however, to go unchallenged, for, at the meeting of the Council last Wednesday, Mr. Berkowitz, who voted against the motion, gave notice of his intention to move, at the next meeting, that the resolution should be rescinded, and a poll of the inhabitants taken on the subject. A councillor said he thought that the proposal would only cause waste of time. The Town Clerk (Mr. C. E. Hatten) suggested that comment should be reserved until the motion came before the Council; and the matter therefore dropped.

After much sorrow caused by many unforeseen delays, Lowestoft is actually in possession of electric light in three of its main thoroughfares; the others will have to wait a little longer for the blessing to be conferred upon them. The expenditure originally contemplated for the scheme was £26,000; but in one way and another the outlay has been increased—partly by carrying the cables over a wider area—until it is expected that by the time the last cheque is drawn for the undertaking above £50,000 will have been laid out. At the formal switching on of the current last Tuesday, by the Mayoress, Mr. Hawtayne, the Consulting Engineer, buoyed up the hopes of those present by quoting returns to the effect that of 60 local authorities who have owned electric lighting works for more than three years, 45 have made "handsome" profits, and 15 an apparent loss. The 60 authorities, taking the good with the bad, made a profit of £86,000. His hearers rejoiced. Will they do so in three years' time?

Some stir has been created among Bedford ratepayers by the fact that the accounts of the Corporation electricity installation show a deficit of £912 for the past year, as compared with a loss of £288 in 1899. The revenue account shows an increase in the sale of current, at 4¾d. per unit, from £4897 to £6342. The public lighting, charged at 3d. per unit, was put down at £2743, and the sewage and water pumping, also charged at 3d., at £1335. While the receipts show an increase, the expenditure has advanced beyond expectation. Fuel alone accounts for £4061—a "jump" of over £1500; wages have advanced to £790; repairs of plant absorbed £646 (just double the outlay in 1899); and salaries came to £602, against £360. The repayment of loans and the interest make the actual burden on the rates £912, or 2d. in the pound. The "Bedfordshire Times," which has always supported the undertaking, calls for an explanation, apart from the rise in coal, of "this increase of 12 per cent. in the proportion of the working expenses to the revenue, which has had such disastrous effects." The installation has had six complete years of working, and nothing is put down for depreciation. An important point further is that, though no fresh loans were floated last year, the overdraft on the capital account at the close stood at £13,441, which was advanced by the bank at 5 per cent. Had this been taken up on loan, there would have been an additional charge of £945 against the concern, which, when reckoned with the £912 deficit, makes a total loss of £1857, or a 4d. rate. In 1894, public lighting by gas alone cost £2000. For the year ending March 31, 1900, it cost £950, which, added to the £2743 for electricity for the public lamps, *plus* £146 for renewals and attendance, makes the total cost of the public lighting £3839, or nearly double the cost of gas alone in 1894.

The course taken by the Mayor of Sudbury (Mr. F. Wheeler), at the meeting of the Town Council on the 5th inst. (*ante*, p. 417), in giving his casting vote against an amendment referring back to the General Purposes Committee the question of applying for a loan for an electric lighting scheme and the erection of a refuse destructor, gave rise to some discussion at the monthly meeting of the Council last Tuesday. On the occasion first referred to, the Mayor ruled one of the councillors (Mr. Mattingly) out of order because he was interested in gas shares; and at a meeting of the General Purposes Committee he applied the same ruling to himself, though he refrained from doing so when his casting vote was required in the Council. Mr. Mattingly called attention to this proceeding; and the Mayor explained that he held the shares merely as a trustee for sale. He said he supposed Mr. Mattingly was aware that he sat there as Chairman of the Committee, and he should certainly feel justified in voting for what his Committee had done. Mr. Mattingly said it seemed to him an extraordinary position to take up, that the Mayor should rule himself out of order for taking any part in the matter in Committee, and then push it through at the Council meeting by a casting vote. He only wished the public to know why he (Mr. Mattingly) did not vote, as he thought the Mayor was abstaining from doing so. He held that if there was one law for him, there was the same law for the Mayor; and he was quite confident that the general feeling was that a scheme which was being forced through by a casting vote in that way was one that was doomed to failure. The Mayor said that, sitting as Chairman of the Committee, he was in duty bound to see that their resolutions were carried. He failed to see what good would result from sending their plans back for amendment. Alderman Grimwood considered that it was a perfect

"staggerer" for the Mayor to have ruled Mr. Mattingly out of order because he was interested in gas shares, when at the same time he was interested in them himself, and gave a casting vote. Alderman Bell said he certainly thought that, after the feeling exhibited by the members of the Council, it would have been policy on the part of the Mayor to refer the matter back to the General Purposes Committee for a full discussion, by which course they would have known where they were. They did not know, nor did the public, what expenditure they were running to. He estimated that their total loans would come to £60,000, while their assessment was only £19,000 or £20,000. They could not afford to do all these things at once, but must do a little at a time. The Mayor held that it was not a question of spending £20,000. If they spent £40,000, so long as it paid, what did it matter? He was doing what he considered would be a grand thing for the town, and one which would lighten their burden in years to come. Mr. Mattingly contended that the mass of opinion in the town did not justify the Mayor's faith in the success of the scheme. Mr. Constable said they were ruining Sudbury, and they knew it. After some explanations of the estimates by the Surveyor, the matter dropped.

Some interesting remarks on the subject of charging for the electric light in York were made at the meeting of the Corporation early last week. In moving the reception of the Electric Lighting Committee's report, Mr. Scott said two slight alterations had just been made. They proposed to omit the price up to 400 units, and make it 5d. per unit up to 600; and above 600 and up to 2000 units, 4½d. There would be so few persons who would come under 400 units, that the Committee thought it was not worth while having a separate rate. Mr. Mansfield asked the Chairman to explain what was the relative value of the electric light at 6d. per unit and gas at 2s. 6d. per 1000 cubic feet. Alderman Wragge inquired whether by reducing the amount to 5d. up to 600 units, the Chairman thought the Committee would give satisfaction to the consumers in the city. Mr. Anderson asked why churches and chapels were to be supplied at 3d. Mr. Scott said the reason was that on Sunday they had not anything like the same demand; and it was worth while to accept the reduced rate in order to get a Sunday load. Their aim was to supply all demands at such a price as would encourage the consumption without taxing those who did not want electricity. As to Mr. Mansfield's question, 6d. per unit was generally considered equal to gas at about 3s. 9d. per 1000 cubic feet. But when people got electricity they would use such a lot. He had been talking to a tradesman who said his bill was three times the cost of gas; whereupon he suggested that probably the tradesman had four times the light, and the tradesman admitted that this was so. Proceeding to move the adoption of the report, Mr. Scott said it was a very serious thing when the newspapers made statements upon insufficient information, because a newspaper was rather like a king who was believed to do no wrong. Having alluded to some criticisms in a local paper, and expressed the wish that before writers said anything about the electric light they would first ask him—a remark which evoked some laughter—he went on to say that one of the greatest troubles the electric light companies had had to face was the frightful difficulty of charging people in anything like a fair manner. If they charged a uniform rate, they charged in the most unfair manner that could be devised. For instance, one consumer had 100 lamps and burned 100 units in ten hours, while another had 500 lamps and burned 100 units in two hours. It cost five times as much to supply the latter as the former, because he wanted his 100 units in two hours. Out of the companies that were supplying electric light, 25 were charging in the manner the York Corporation charged, and 15 only on a flat rate. Out of the local authorities, 58 were supplying it on the rebate system, and 17 only upon the flat rate system. Therefore, it was not an iniquity that York had fallen into; it was really a beneficent system whereby the charges could be made a little bit more fairly. And so far from charging the small consumer in order to let the large one have the current cheaper, the quantity consumed was not in any way the measure as to whether the price was 7d. or 2d.; it was a question of the time the consumer had taken to burn it. As a matter of fact, in York there were only twelve customers who had paid as much as 7d., and nine of these had offices, which, of course, only required the light for an hour or two. It must come dear to them. There were only 17 more over 6d., and the remaining 150 were all below 6d. The average price for everybody was 4·6d., or just over 4½d., and the lowest price was 3·2d. It was those who used the current a long time who got it cheaper. With regard to the flat rate, there might be some people for whom it would be cheaper; but for 90 out of 100 it would be far better to go upon the rebate system. As time went on they hoped to reduce the price. Mr. Lund, in seconding the motion, said 7d. per unit covered all standing charges; that being the price it cost them to supply electricity for one hour for the number of lights at present in use. Their policy was to charge 7d. for the first hour, and after that supply it practically at cost price. The report was adopted.

Shepton Mallet District Council and the Gas-Works.—The Shepton Mallet Gas Company having intimated to the Urban District Council that they are willing to offer every facility for enabling them to arrive at a valuation of the undertaking, will allow the inspection of their books, plant, and works, and will also be perfectly prepared to consider and lay before the shareholders any offer the Council may wish to make with respect to purchase, Mr. W. A. Valon has been engaged to value the works on behalf of the Council.

Divining for Water.—At Bury's Hall, Ashill, near Watton (Norfolk), the residence of Mr. W. Oldfield, scarcity of water led to the engagement of a diviner, who visited the premises, and, after the usual proceedings, indicated a spot where he said good water could be obtained at 25 feet below the surface. A local firm were then engaged to sink a well at that place; and we learn from a local paper that "when the men had reached a depth of 24½ feet, abundance of excellent water was met, the supply being so great that it was found almost impossible to dig out the last 6 inches. Before the bricking up could be completed, there was 13 feet of good spring water in the well. It appears that an old and disused well, situated only a few yards off, is 145 feet deep, but contains scarcely any water.

NEWTOWN AND LLANLLWCHAIARN GAS ARBITRATION.

WESTMINSTER PALACE HOTEL, LONDON—Wednesday, Feb. 13.

(*Before Mr.* J. MANSERGH, M.Inst.C.E., *Umpire.*)

This was an arbitration to decide the amount to be paid by the Newtown Urban District Council for the acquisition of the undertaking of the Newtown and Llanllwchaiarn Gas Company. Mr. W. A. VALON was Arbitrator for the Council; and Mr. SHIRESS WILL, K.C., for the Company.

Mr. C. A. CRIPPS, K.C., and Mr. ERNEST MOON appeared for the Company; Mr. BALFOUR BROWNE, K.C., and the Hon. J. D. FITZGERALD represented the Urban District Council.

Mr. CRIPPS, in opening, said the Company had been non-statutory until 1899, when they obtained a Provisional Order. The only important section was the 34th—the purchase clause—which was inserted as the price of the Order. It provided that, if the Urban District Council introduced a Bill in the next session for the purchase of the undertaking, the Company should not oppose except to secure protective clauses; and the price, failing agreement, was to be determined by arbitration under the Lands Clauses Acts. It was also provided that no officer or servant who had been in the employ of the Company for 14 years or upwards should lose his right to compensation by declining to enter the service of the Council; and further, that the Arbitrators, in assessing the sum to be paid by the Council to the Company, should not have regard to the fact that the Company had obtained the Order. This was a provision which told both ways, because, while their value was not to be assessed as that of a statutory Company, the Company were not under any statutory restrictions in regard to dividend. In 1900, the Newtown District Council obtained an Act for the purchase of the undertaking, in which was also inserted the provision that the Arbitrators, in fixing the price to be paid, should not have regard to the fact that the Company obtained the Order in 1899. The first question was to ascertain the net revenue of the Company in the last full year of their existence—that was, the year ending June 30, 1900. Messrs. Lass, Wood, and Drew, for the Company, and Messrs. Cash, Stone, and Co., for the Council, had gone carefully into the accounts, and had approached nearly to agreement; the Company's figure of profit on gas for the year being £1504 2s. 3d., against £1461 12s. 4d.—a difference of only £42 9s. 11d. This sum was more than balanced by one item of £44 0s. 4d., which was one-fifth of the costs incurred in the year ending June 30, 1899. In that year the Company instituted an appeal; but Mr. Stevenson advised them not to proceed with it if they were going to be purchased so soon, and it was therefore abandoned. Probably when the Council obtained possession of the concern there would not be any rating appeals between themselves as owners of the concern and themselves as regarded their rating interests.

Mr. BALFOUR BROWNE: They will not be the rating authority.

Mr. CRIPPS: The interests will be very close. If, however, they did appeal, and succeeded, this would enhance the value of the property, because the present valuation was taken on the higher rating figure. He held that this ought not to be a deduction. There were other give-and-take items, which were not worth troubling the Court with. After having ascertained the profit on gas, there were two items—certain rentals and profits on sales of fittings—which were added on both sides, making the income, according to the Company, £1633 13s. 6d., and according to the Council £1590 18s. 2d. The profit on gas in 1900 showed an increase over the two preceding years of about £350. This difference was due to a larger gas supply, to discounts allowed in previous years being discontinued, and (as to £50) to prevention of leakage. The percentage of leakage was still high; being 13·85 in 1900, and 17·8 in 1899. In the valuations, the figure of £1504 2s. 3d. was taken, from which a deduction of £8 17s. 6d. was made for a reduction in stock; leaving £1495 4s. 9d. The year 1900 was peculiarly favourable as regards the cost for works, mains, and services; the figure being 3·23d. per 1000 cubic feet of gas sold. But Mr. Stevenson thought it should be taken at 4·5d., which meant an adjustment of £74 16s. 7d. This, however, was reduced by £12 12s. 6d., the estimated value of the Manager's time attributable to repair of works for the year; leaving £62 4s. 1d. This produced the sum of £1433 0s. 8d. Then the amount derived from the sale of sulphate of ammonia (£5 15s. 11d.), Mr. Stevenson said should be £96; and therefore the Company sought to add the difference—£90 4s. 1d. The cottage rents were agreed at £99 6s. 9d. These amounts brought out the figure of £1622 11s. 6d. Being a non-statutory Company, 26¾ years' purchase was taken, which produced £43,268 13s. 4d. The profit on fittings the Company took at £28 3s. 9d., and capitalized at five years' purchase, making £140 18s. 9d., which, with the £43,268 13s. 4d., made £43,409 12s. 1d., or, *plus* the usual 10 per cent. for the sale being compulsory, £47,750 11s. 3d. To this a further sum of £792 was added, being the difference between £1142, the value of the surplus works, and £350, the cost of the new sulphate works. This gave the ultimate figure of £48,542 11s. 3d.

Mr. *Samuel Wood*, a member of the firm of Lass, Wood, and Drew, said that he had taken out the statistics of the Company, which were embodied in the tables.

Cross-examined by Mr. BALFOUR BROWNE: The profit in 1898 was £1138 13s. 7d., in 1899 £1149 4s. 6d., and in 1900 there was a remarkable rise to £1504 2s. 3d. In 1898, the profit on sulphate was only 10s.; the average of the three years was £13 or £14. The Manager received £110 per annum; and the figure of £12 12s. 6d. was obtained by the Manager going over his note-book, and ascertaining what he had been doing upon repair of works. The object was to show that more had been spent on these repairs than was indicated in the tables. In 1899 and 1900, the Company dispensed with an engineer, although they consulted one in 1898, at a cost of £25. Witness agreed that several items had decreased in 1900 over previous years; and these decreases had something to do with the increase of profit in that year.

Mr. *E. H. Stevenson*, examined by Mr. CRIPPS, said he had made himself familiar with the works of the Company, and had a good knowledge of the town. The works were conveniently and centrally

situated, and more than capable of supplying the present maximum demand of 105,000 cubic feet; the capacity of the retorts, allowing for a stand-by, being 126,500 cubic feet daily. The condenser, consisting of six columns, was of three times the required capacity. The purifiers, four in number, 10 feet square, were equal to purifying at least 200,000 cubic feet a day, so that they were 47½ per cent. larger than they need be. They were well constructed. The station-meter had a nominal capacity of 240,000 cubic feet, so that there was large reserve power there. The total of these excesses worked out to £1142. The gas-holders were quite large enough for present demands; the smaller one, as a fact, never having been required to be used at night. The larger one, owing to peculiar circumstances, was sufficient. The day consumption of gas was very large—sometimes even larger than the night consumption. The smaller holder had a working capacity of 13,800 cubic feet, and the larger one of 72,200 feet—a total of 86,000 cubic feet. The mains were all ample in size, with one exception—that was in the New Road, where some fresh consumers and a gas-engine had lately been put on. The main ought to be, and would have been, enlarged, if the Company had remained in possession. A considerable amount of gas was consumed by Pryce Jones, Limited, and three other mills. The Company could increase the output very considerably, even if these mills gave up—of course, not absolutely immediately, but in a very short period, for they had practically no prepayment meters, and a considerable number of people wanted to become consumers. Since the year of the account, they had secured fresh consumers who would burn some 400,000 cubic feet a year. In the urban part of the district of supply there were 1734 houses, of which in the account year only 366 were supplied. Pryce Jones, Limited, were likely to cease taking gas to some extent and use electricity; and the Company would thus probably lose the supply of 1,744,000 cubic feet in connection with this firm. The profit the Company would lose was £142 12s. 10d.; but since the account year they had raised the price of gas to meet the increase in the cost of coal. This would give an increase of profit on the whole concern, in the account year, of £127 8s.; so that the actual loss upon Pryce Jones, Limited, would only be £14 14s. 10d. Since then the Company had secured extra consumers who were taking about 380,000 cubic feet per annum; and this alone gave a profit of £45 8s. 2d., and therefore wiped off Messrs. Pryce Jones's loss absolutely. The Company struck a trial balance-sheet for the last half year, and found that the profits were much larger than in the corresponding six months of 1899; so there was not the slightest doubt that the profits would be maintained. In his valuation, he started with the profit as shown by the Accountants (£1504 2s. 3d.), from which he deducted £8 17s. 6d., because of an error in the value of the stock, leaving £1495 4s. 9d. As to the £44 0s. 4d., he thought no part of the law charges in connection with the assessment should be debited against the 1900 account. In his experience, works of this description, and in such a neighbourhood—comparatively near to the district where iron and fire-clay were obtained—should, on the average, expend 4½d. per 1000 cubic feet on repairs of works, mains, and service-pipes. As a fact, the Company did, on the last three years, expend 4·59d., which was practically the figure he had taken. This alteration made a difference of £74 16s. 7d. The item for the Manager's services was for the actual time he spent in assisting manually at the minor repairs, and, deducted from the £74 16s. 7d., left £62 4s. 1d., which, deducted again from the £1495 4s. 9d., left £1433 0s. 8d. As to sulphate of ammonia, the Company in 1883 erected works which brought in a very good return; but they were now very much in need of repair, and also out of date. When they were in Parliament, they obtained tenders for new apparatus. Then the purchase clause was put upon them; and they thought it unwise to expend about £350 on apparatus and building, when probably the undertaking would pass out of their hands in a year. Otherwise the works would have been built and in full operation long before now. He arrived at the figure of £96 by assuming that the coal carbonized would produce 16 tons (that was a little less than the usual allowance of 1 ton per 100 tons of coal carbonized), and allowing £6 per ton. From this he deducted the sum actually received, leaving £90 4s. 1d. The cottage rents were agreed at £99 6s. 7d. These two sums brought the figure of £1433 0s. 8d. to £1622 11s. 6d., to which he applied the multiplier of 26⅝ years, which was the number now invariably asked. He had taken the Company as being non-statutory. The profit on the fittings he capitalized at five years' purchase, producing £140 18s. 9d.; and he allowed 10 per cent. for compulsory purchase. The surplus works he put as follows: Retorts £283, retort-house £90, two-thirds of the value of the condensers £166, 47½ per cent. of the value of the purifiers and purifying-house £503, and meter £100—a total of £1142, from which there had to be deducted the cost of the sulphate works £350, leaving a net addition to be made of £792. In this way, he arrived at his final figure of £48,542 11s. 3d.

Cross-examined by Mr. BALFOUR BROWNE: Comparing 1841 with 1891, the population of Newtown had decreased; but since 1891 many buildings had been erected, and the business of the place had grown considerably. Newtown was formerly the seat of an important flannel industry. This had gone; but the business of Pryce Jones, Limited, had largely increased. He did not agree that the number of houses in the district was only 1541, and not 1734 as he had given it. It was possible that 729 of these houses were rated at less than £5 2s.; 277 of them being under £2 10s. The works were not old. There was little room for expansion; but they were not too crowded. From 50 to 60 per cent. more gas could be produced by adding one set of retorts. The production per mouthpiece he ascertained from the books was 6000 cubic feet; but he only took it at 5500. In connection with prepayment meters, the charge of the Company was 5s. 2d. per 1000 cubic feet, which was not high for the district. Pryce Jones, Limited, might be supplying electricity to their warehouse and factory now; but they were not when he was in the locality. The present charge of the Company—4s. 7d. per 1000 cubic feet—was the maximum allowed by the Order; but he was not sure that the Order governed the Company. The correct figure for repairs and maintenance of works and mains was 4·5d. The greater part of the works had been bought within the last ten years, so that they were new to all intents and purposes. His usual figure was not from 5d. to 5½d.; he judged every place by itself. In regard to the sulphate works, he simply claimed for what the Company had been doing when they were interfered with. The £90 claimed under this head, multiplied by 26⅝ years, with the usual 10 per cent., amounted to £2640, which (less the £350 for the necessary works) he was asking to be awarded because the Company had got the contracts or tenders for doing the work.

Mr. *W. R. Chester*, examined by Mr. MOON, said the works were well situated for the economical supply of gas, being alongside the River Severn, and at a low level. There was not much room on the existing land for further extensions; but there was land immediately adjoining which could be utilized for the purpose. The plant had been practically renewed in the last ten years; and there was ample room for the present make. With the exception that he had made his valuation of the excess plant £1324, as against Mr. Stevenson's £1124, their figures were the same. The £1324 was made up as follows: Retorts and retort-house £623, condensers £250, purifiers £351, and station-meter £100; and from this sum he deducted £350 to provide a new sulphate of ammonia plant. As to the possibility of increasing the revenue by means of prepayment meters, he said in the great majority of towns the meters averaged one per house. Here the average was one every six houses; so that there was this margin to fill in. The consumption per meter would be about 10,000 cubic feet, or with a stove from 10,000 to 15,000 feet. At present there were only 29 gas-cooking stoves in use, so that in this direction also the town was almost absolutely undeveloped. When the Council had the concern, they would experience an immediate growth in the demand for gas; there being persons waiting to be connected, who would have been connected before now if the Company had been a continuing concern. He was confident the revenue would be largely increased in future.

Cross-examined by Mr. BALFOUR BROWNE: There was no part of the works below the proper capacity.

Mr. *C. T. M. Taylor*, Assistant Clerk to the Guardians of Newtown and Llanllwchaiarn Union and to the Assessment Committee, said there were 1107 houses connected or close to the mains in Newtown, and 610 in the other parish—a total of 1717. Supplemental valuation lists accounted for the other 17 of which Mr. Stevenson spoke. Since 1891, the births over the deaths showed an increase of 706. The inhabited houses in the census of 1891 were 1420; the population being 6610. If there were the same number per house now as in that year, the present population would be 7271. Building was going on, and there was likely to be an increased demand for gas.

Cross-examined: He was brother of the Gas Manager, and was connected also with the Solicitor of the Company. There were not more than two or three houses standing vacant because they could not get tenants. He agreed that the hands employed at the Cambrian Mills had diminished enormously. The houses built on new sites in the last fifteen years might amount to only 41. He knew that the firm of Pryce Jones had recently applied for leave to break up a street, in order to supply another portion of their works with electricity; but he did not know that the firm could supply the Severn Tweed Company's Mill and the Severn Valley Mill with electricity without going off their land.

Mr. *R. Lloyd*, Chairman of the Gas Company, said of recent years very large sums had been expended by the Company in new works, extensions, and renewals; the plant having been almost entirely rebuilt in the last ten years, and equipped with the most modern appliances. Owing to bad management, the percentage of leakage had been very high. The trade of the town was never more prosperous than at the present time. Besides flannel, Welsh tweeds and Welsh shawls were now made there. He was strongly of opinion that the demand for gas would increase year by year.

Witness having been briefly cross-examined, the case for the Company closed.

Mr. BALFOUR BROWNE, on behalf of the Urban District Council, said the two main questions were as to what was the maintainable revenue, and how this revenue was secured. It was obvious that the Company, since 1899, when they knew purchase was coming, had done everything they could to reduce expenditure and swell profits. It was curious that they had been able to reduce the unaccounted-for gas so largely; and then there was the discontinuance of discounts, which action, he held, was taken solely to have the amount multiplied by 26⅝ years' purchase. This, however, only produced a fictitious profit. Then they had increased the price at the period of purchase; and when the Court heard that the price they were charging was 4s. 7d. per 1000 cubic feet, they would come to the conclusion, he thought, that, if this had gone on, they would certainly have lost some customers, instead of getting any new ones. The small houses in Newtown could not be expected to take gas at 4s. 7d. and (when by prepayment meter) 5s. 2d. per 1000 cubic feet. The highest price ever paid in the market for the shares was £12 10s.; yet Mr. Stevenson's valuation worked out at £32. In their valuation, the Council's witnesses started with a figure, obtained from Mr. Cash, of the profit for the year; but they held this was not maintainable, because it only resulted from putting the expenses of that year against the receipts, whereas in that year the expenses were unduly kept down. The Council took repairs and maintenance at 5¾d., which, there was good ground for believing, was a fair amount. Again, purification was not efficient; and the figure for carbonizing wages and bad debts should be increased. The total of the deductions made by the Counsel amounted to 3·3d. per 1000 cubic feet, or, upon the sale of gas (14,140,985 cubic feet), £194 8s. 9d. Then in the tables the rental for meters was put down for the year at £48 1s. 9d., or 30 per cent. on the value of the meters, which was a ridiculous sum to charge. Allowing, as was proper, only 10 per cent., meant a still further reduction, and left £1208 10s. 8d. as the revenue. As a fact, the concern had lost the account of Messrs. Pryce Jones, who had installed the electric light; and, further, there were only four other firms in the town with a large consumption, and two of these were amalgamated with Pryce Jones, Limited. The prosperity of the town depended upon that firm, and nothing else; and but for them, instead of stagnation, which was his case, there would have been absolute decadence. The amount received from Messrs. Pryce Jones was £400, the profit on which was £133. Deducting this left £1074 as the net maintainable profit. He reviewed the condition of the town, the circumstances of which he said were such as to warrant the sum being capitalized on the 5 per cent. table, or at 20 years' purchase. As to the works, it would be shown that they were much more largely deficient than in excess. Regarding Mr. Stevenson's flight of

imagination with reference to spending £350 on sulphate plant to produce £2250 in the award, it was really too late in the day to put such a case before the Arbitrators. The Council were purchasing the works as they were, not as they might have been; and he therefore asked the Court to disallow this ridiculous and exaggerated sum altogether. The Company were right, he agreed, in treating the cottage rents as part of the undertaking; but who ever heard of cottages being valued at 26¾ years' purchase? The ordinary multiplier for such property was 16 years at most; but Mr. Colson had been liberal, and allowed 18 years, which would make an enormous difference in the valuation. With regard to the 10 per cent. allowance for compulsory purchase, he held that there was no direction to allow it, and that if the Company received the full value of the works—whether £40,000 or £20,000—*plus* a small sum to cover cost of reinvestment, they were entitled to no more.

Mr. *Cash*, of Messrs. Cash, Stone, and Co., said he had, on behalf of the Council, gone into the accounts of the Company; and he produced tables showing his figures. The total capital was £15,000, of which £14,997 was paid up. When the old Company was wound up and the new Company registered, in 1879, for every £10 paid by the shareholders in the old Company they received in the new Company shares upon which £47 10s. was credited. The £15,000 of capital represented £5625 paid in cash by the shareholders; the balance (£9375) having been written up. The main difference between witness and the other Accountants was as to the £44 0s. 4d.

Cross-examined by Mr. CRIPPS: He did not know that when the transfer from the old to the new Company was made, it was on an actual valuation.

Mr. *Alfred Colson*, examined by Mr. FITZGERALD, said the carbonizing plant consisted of five beds of retorts, three containing six retorts each, and two five each. Allowing one bed of five as a stand-by, the plant was capable of producing, at 4500 cubic feet per mouthpiece, 103,500 feet per day, or 3700 cubic feet less than the maximum day's output. The coal storage was equal to 256 tons, or 23 days' maximum consumption; whereas it should be equal to 462 tons, or 42 maximum days' requirements. There was therefore a shortage of 206 tons. The theoretical capacity of the condenser was 150,000 cubic feet, which gave an excess of 40,000 feet; but it was surrounded by buildings, and in the winter, if it was working at its maximum with a somewhat high temperature, it could not do more than meet the present output. Therefore he allowed no surplus. The exhauster was equal to 240,000 cubic feet per day. But there being no duplicate machine, he considered there was no excess. The washer was of the Livesey type, and capable of dealing with 200,000 feet daily—nearly double the maximum output. As, however, it was the smallest apparatus of the kind made, he allowed for no surplus. The scrubber was only equal to half the required capacity, the purifiers were 50 per cent. in excess, the station-meter was double the necessary capacity, the gasholders were 20 per cent. deficient, and the Cornish boiler should be duplicated. Speaking generally, the buildings were old and contracted (the area on which they stood being 1815 square yards), and the plant of necessity much crowded, rendering a serious explosion possible at any moment. Of 10,118 yards of mains, no less than 6116 yards were 2-inch. There were only eleven prepayment meters; the system not having caught on, and being hardly likely to do so with the price at 5s. 5d. or 5s. 2d. per 1000 cubic feet. He calculated the structural value of the works at £12,663, including the cottages, or £11,038 excluding the cottages. This was equal to £785 per million cubic feet sold, which was a liberal figure for works of the kind. Coming to the commercial value of the concern, he found that the population had for fifteen years been nearly stationary. The rate of increase of gas sold also had been very small.

Thursday, Feb. 14.

Mr. *Colson*, further examined by Mr. FITZGERALD, said in his valuation he started with the profit on gas shown by Messrs. Cash, Stone, and Co., of £1461 12s. 4d., and deducted £3, which had been transferred to the fittings account, leaving £1458 12s. 4d. In regard to the assessment appeal, which he thought a little hard on the Company, he spread the cost over ten years, and allowed £22 0s. 2d.; making the total £1480 12s. 6d. The charges for maintenance and repairs, he found to be very low. In an average year, they ought to be 5½d. per 1000 cubic feet; and he therefore increased the amount by 2·51d. Purification, carbonizing, and bad debts were all under-charged; and he therefore made adjustments by adding for these items, respectively 0·41d., 0·28d., and 0·10d., making the total of the under-charges 3·3d., which represented £194 8s. 9d., and, deducted from the £1480 12s. 6d., left the profit at £1286 3s. 9d. The charge for meter-rents was very high; being 30 per cent. on the capital value. He allowed 10 per cent. on the capital invested, which represented a reduction of £32 5s. 9d., leaving £1253 18s. In regard to Pryce Jones's account, he arrived at the profit by deducting from the average price charged (3s. 10½d. per 1000 cubic feet) the cost of coal and working expenses, and adding 3·3d. for under-charges. This brought the total profit to 1s. 3·8d. per 1000 cubic feet, which represented £133 11s. 6d.; and deducting this sum, brought out £1120 6s. 6d. as maintainable profit for the year. Taking everything into consideration, 20 years' purchase would be fair; and this would produce £22,406 10s. In arriving at this figure, he bore in mind the non-growth of the town, the decay of its industries, the loss of Pryce Jones's account, the high price of gas, and the condition and capacity of the works. Having regard to all these points, the security could not be considered good. Then he deducted for deficiencies (less surplus, where there was a surplus) £902, leaving £21,504 10s. The £902 he arrived at by allowing for deficiency on the coal-store £112, on the scrubber £190, on the gasholders £665, and on the boiler £105—a total of £1072, from which he subtracted £170 for the surplus purifiers, leaving a deficiency of £902. The profits on fittings he took on the average of three years, £19 16s. 11d., and added the £3 erroneously charged to gas profits, making £22 16s. 11d. Capitalized at three years' purchase, this gave £68 10s. 9d., which increased the total to £21,573 0s. 9d. The houses he took at an average rent of £90 6s. 6d., which, at 18 years' purchase, represented £1625 17s., making the final figure of his valuation £23,198 17s. 9d.

Cross-examined by Mr. MOON. He concluded that carbonizing in 1900 was under-charged, because there had been a gradual reduction in the item from 3·09d., and because of his experience, which told him that carbonizing could not be carried on for any length of time at less than 3d. per 1000 cubic feet. He thought 3d. was a fair charge. In 1898, the wages for carbonizing 1718 tons were £163; in 1900, only 1680 tons were carbonized. It was rather difficult, therefore, to say why the wages should be higher. The cost for purification in 1900 was 0·14d., to which he added 0·41d., because it could not possibly be done under that figure. With regard to repairs and maintenance, he should not dream of taking the average in works like these. The average of the last three years was 4·62d., which was a good deal below his figure of 5½d. As to the years' purchase, if this were a first-class non-statutory company, he should adopt the multiplier of 26¾; but as it was the opposite, he could not admit that anything above 20 years should be taken. The coal-store capacity was 256 tons; he did not know the Company had actually stored 400 tons there. They should have three months' coal storage capacity. This had become a matter of compulsion. The gasholder should be equal to the maximum day's output; and as this had been 109,000 cubic feet, and the storage amounted to less than 90,000 feet; there was a deficiency. The fact that 55 per cent. of the gas was consumed in the daytime did not affect the question at all. A new boiler was wanted. There was no stand-by. The Company had an old boiler, which was bought second-hand; but this would be of no earthly use. He put the capacity of the retorts at 4500 cubic feet per mouthpiece. At times he believed they had turned out larger quantities; but it was necessary to take, not the capacity under exceptional circumstances, but the average output—what could be absolutely relied on.

Re-examined: In arriving at the figures for deductions, he had acted on his experience; and he had charge, more or less, of about twenty different small gas-works. As to his figure with regard to carbonizing, he pointed out that wages had been rising, and were still rising. The figure given for purifying was absolutely too low to ensure pure gas being produced.

Lieut.-Col. *E. Pryce Jones*, M.P., the Managing-Director of Pryce Jones, Limited, and Chairman of the Severn Valley Powysland Mills, said he carried on business at Newtown and Welshpool. Pryce Jones employed about 540 hands. He gave evidence as to their electric installation worked by a gas-engine supplied with gas by the Company. In September, 1899, his firm applied to the District Council for permission to open the streets between the warehouse and factory and Tibbott's Mill, which they had just acquired, and in which they were installing an electric light plant. Permission was granted; and the generating station was established at Tibbott's Mill. From the station the firm were just commencing to supply both the warehouse and factory. The motive power used in the generating station was steam, not gas. Terms had been arranged for the amalgamation of the Severn Valley and the Severn Tweed Companies; and it was proposed to light both these concerns with electricity from the existing station, if they had the right to do so.

In cross-examination, witness agreed that he had said he did not know of a single instance where the introduction of the electric light had affected the gas company or the gas consumer. In a speech which he made, he admitted contemplating that the income of the Company might work up to £2000 a year. He did not think Newtown was going wholly to grief in the next few years; but the town was not in a good condition. He stated in a letter: "The time will come when gas will be used by almost every householder for cooking purposes, if not for lighting as well"—showing the likelihood of a rise of the Company's revenue. He also said: "The Newtown Gas Company have acquired further borrowing power to extend their works, in view of the increased demand in the early future."

Mr. VALON: May I ask whether your ideas of increased consumption were not based upon the possible reduction in the price if the Local Authority purchased the works?

Witness: Certainly.

Mr. CRIPPS: I did not find any expression of that.

Witness: But that is so, most certainly; and, of course, the town will have to expend a very large sum in fitting up the automatic appliances.

Mr. *F. W. Stevenson*, examined by Mr. FITZGERALD, said he had been engaged for 25 years in the construction and management of gas concerns; and until 1899 had been for eleven years Chief Engineer of the Sheffield Gas Company. He considered the works of the Newtown Company extremely cramped and dangerously crowded. When he visited them with Mr. Colson, hot coke was being wheeled from the retort-house and tipped upon the only available place for coke storing, under that space being one of the tar and liquor tanks, which he considered extremely dangerous. The coal storage was beyond doubt deficient. There should be storage for eight weeks' maximum consumption, or 496 tons; instead of which he made the coal storage only 284 tons. He then put in a valuation which differed very little from that of Mr. Colson. He started with the same figure, £1461 12s. 4d., and made the same addition in respect of the assessment. There was a sum of £3 credited to the gas account which should have been credited to the fittings account; and, on the other hand, £1 7s. was debited to the gas account. So that he had taken the difference at £1 13s., and deducted that. As to deductions, he took the same figure as Mr. Colson, 3·30d.; and then he made a further reduction of 10 per cent. for repairs, maintenance, and depreciation of meters, but allowed the amount of £9 14s. 3d. which appeared in the accounts to that charge. Other deductions were £25, the sum allowed in previous accounts for the Engineer, and the profit derived from Messrs. Pryce Jones's account; and in that way he arrived at the net profit of £1117 11s. 6d. The security of this Company would not warrant anyone investing in it unless he obtained a 5 per cent. return, having regard to the congested state of the works, the high price charged for gas, and the loss which would occur through decreased consumption; and therefore no more than 20 years' purchase should be paid, which gave £22,351 10s. The deficiencies he estimated as follows: Land £76, coal-stores £111, exhausting plant £60, boiler and shed £110, scrubbers £138, and gasholders £530—a total of £1025. The excess works he calculated thus: Condensers £76, purifiers £185, and station meter £66—a total of £327; and this, subtracted from the £1025, left £698 to be taken from the £22,351 10s., which produced £21,653 10s. In regard to

the cottage property, he took the average rent for three years, and allowed 18 years' purchase. The fittings he capitalized at three years' purchase. Thus the total valuation, according to his figures, worked out at £23,343 16s.

Cross-examined by Mr. CRIPPS: He put the repair and maintenance of works, mains, and services at 5¼d.

In further cross-examination as to why the expenditure under this head should be other than the average of similar works, witness said the works were in very poor condition; and 62 per cent. of the mains being only of 2 inches diameter, the repairs to them would cost a great deal more than if they were larger. He did not think he should ever put the figure as low as 4½d. He did not think with a non-statutory Company, even with an income which was certainly maintainable and having a prospect of increase, that he should take so much as 26⅔ years' purchase. He did not think there was any accepted number of years' purchase.

Mr. *John Humphreys*, a flannel manufacturer, of Newtown, said until five or six years ago he was Mill Manager for Messrs. George Morgan and Co. That mill had now been dismantled and converted into a number of cottages. He carried on his business in a water-power mill, which was not now, as it had been formerly, lighted with gas. Going back thirty years, there were a large number of factories in Newtown at work. But they had disappeared; and though other industries had sprung up, they did not employ as many hands.

Mr. CRIPPS, in cross-examination: There has been a change in the direction of your industries at Newtown. That is what all that comes to, is it not?

Witness: Yes. He agreed that in a document signed by the Chairman and the Clerk of the Urban District Council (of which he was a member) they said: "There is no doubt the consumption of gas will increase when the consumers feel that they are using their own property and getting back some of the cost in relief of the rates; and all this will be an immediate source of profit to the town. . . . A good deal has been said at Newtown about electric light; but if the cost of electricity in small places like Newtown is considered, it will be seen that it will be quite unable to compete with gas." That view was sound.

Mr. *A. S. Cooke*, an auctioneer and estate agent, and Chairman of the Gas Committee of the Newtown Urban District Council, examined by Mr. FitzGerald, said Newtown had been stagnant with regard to population for years. There had been a number of new houses; but generally they were built to take the place of older ones. Up till last year the Company allowed a discount of 5 per cent. on consumers' accounts. Last year they withdrew the discount. At the same time the price of coke rose considerably—from 10s. to £1. A fair number of years' purchase for the cottage property of the Gas Company would be 15 for the old and 20 for the new, or an average of 18 years. In 1897 he sold 100 £10 shares of the Gas Company at prices ranging from £12 10s. to £12 5s. each. None were purchased by a Director of the Gas Company.

Mr. CRIPPS, in cross-examination: I see you were the Chairman who signed this memorandum. Is this true: "The Council have obtained particulars of the local authorities in England and Wales (53 in number) who have purchased local gas-works since 1876; and a list of these authorities, showing in each case the results of the working for the year ending March 25, 1898, extracted from the Parliamentary Returns, is annexed hereto. It will be seen from this extract that 45 of these authorities made a net profit after payment of all expenses, the interest on loan, and instalment of principal, such net profit amounting in the whole to £61,459; while the remaining eight showed a deficiency, after payment of interest on loan and instalment of principal, amounting in the whole to £3613—leaving a balance of net profit, after payment of interest on loan and instalment of sinking fund on the whole 53 gas undertakings acquired since 1876, of no less than £57,846, or an average net profit for the year, after paying interest on loan and instalment of principal, of over £1091 on each gas undertaking acquired." You got those statistics?

Witness: Our legal friends prepared that statement. I daresay it is correct.

Mr. FITZGERALD: Whether the purchase turns out of value to the local authority must depend upon the price they pay?

Witness: That is so.

This closed the evidence.

Mr. FITZGERALD then addressed the Court, turning to the points really in dispute. The first was as to what allowance should be made in respect of the costs of the assessment appeal. These costs, having been incurred, ought to be spread over a number of years. This particular appeal was not prosecuted; but if the concern had remained in the hands of the Company, it would have been prosecuted certainly within the next ten years. That was how the claimant's valuers had treated the item—bringing £22 into account for this year. The next substantial question was whether the allowance for repairs and maintenance should be 4½d. or 5½d. It was for the Court to decide; but he would point out that in the year 1898, before the question of purchase had cropped up, and before the Company had commenced the attempt—which was evident on the face of the accounts—to cut down their expenditure in order to present a more favourable condition at the time of sale, the figures worked out practically to the sum mentioned by Mr. Colson and Mr. Stevenson. Then Mr. Stevenson deducted £12 12s. 6d. from the salary of the Manager, and credited it to repairs and maintenance. Did anyone ever hear of a gas manager's salary being dealt with in that way? He never knew such a deduction to be suggested; and he hoped the Court would disallow it. The contention with regard to sulphate of ammonia was a very old hare which Mr. H. E. Jones had started on a great many occasions. They were asked to value the hypothetical income of a non-existent business at 26⅔ years' purchase, and then—it was really too delicious—give them 10 per cent. on that sum for being compulsorily expropriated from a business having no existence. As to the cottages, he suggested that the claim of 26⅔ years' purchase of the net rents of property of this kind was absurd, and that 18 was the fairer figure. The largest difference in the valuations arose as to the multiplier to be applied to the net income. Here they were valuing a non-statutory Company; yet they were asked to value it as if it was a first-rate statutory concern. A non-statutory company had always been taken to be worth several years' purchase less than a statutory company under the same circumstances. Unless that was so, there was no meaning in the proviso to the purchase clause in the local Act—that the undertaking when sold was to be valued as non-statutory. A statutory company was worth more than a non-statutory concern, because it had a *quasi* monopoly; whereas a non-statutory concern had none. In addition, the non-statutory company could not legally carry on its business at all. It could only open streets by committing an indictable offence; and though the law had rarely been put in force against a non-statutory company, wherever it had been, as in the Longton and Cambridge cases, the end had been that the non-statutory company had gone to the wall. Mr. Balfour Browne said the Court were to compensate the shareholders here for what they were losing. Surely one test was: At what number of years' purchase could they invest the money awarded them so as to get the same income in undertakings of a similar class? The stock and share lists showed that in statutory concerns of much higher character, with much better secured incomes than that of the Newtown Company, they could invest at from 5¼ to 4¾ per cent. If that were so, was it not fair to say that for this non-statutory Company, in a non-progressive town, 20 years' purchase was ample? With regard to the 10 per cent. allowance, he read a paragraph from the report of the last Royal Commission on the Metropolitan Water Supply, in which they said: "It is scarcely necessary to say that there is nothing in the Lands Clauses Act which requires the arbitrator to award anything in respect of compulsory sale; nor is it correct to say that any custom has grown up under the Act under which arbitrators consider themselves bound to make any such award, although it is true, no doubt, that some percentage has not infrequently been added to the amount of the awards under that Act in view of the compulsory character of the sale, and as a solatium to an owner dispossessed of property to which associations of family or personal interest may attach. In the present case, it would be improper for an arbitrator to give any compensation in the nature of a solatium of that kind for the deprivation of water shares [he read, in 'gas' shares]; but it is possible an arbitrator might justly award something beyond the bare value of both present and prospective income, if any. The dispossessed shareholders would be properly entitled to be recouped for the delay that might occur in finding an equally good investment yielding the same income, as well as for the cost of reinvestment, in addition to the sum which that investment would require." There never was a more favourable time for investing money than the present. So that the money would not be idle long; and if a sum were added to cover the reinvestment, the Court would treat them very fairly. In conclusion, he referred to the loss of consumption which would probably occur in connection with the mills, and submitted that the Company would do well if they received compensation on the basis of Mr. Colson's and Mr. Fletcher Stevenson's valuations.

Mr. CRIPPS, in reply, agreed that there should be some allowance as to the cost of the assessment appeal; and it rested with the tribunal to say how much should be allocated to this particular year. But he should not think a company of this kind would have the luxury of an appeal once in ten years. With regard to whether 4½d. or 5½d. was the right figure to allow for repairs and maintenance, he said Field's Analysis gave 4·36d. for the large provincial gas companies. The question was whether there were special circumstances here to justify the higher figure. He was aware of none, and none had been stated; and therefore he urged the smaller figure of 4½d. should be taken. As to sulphate of ammonia, he agreed that if they were suggesting a hypothetical business, and asking 26⅔ years' purchase, it would not be maintainable. But that was not the case here. The business existed. In some years in the past, it went up to as much as £180 a year; but owing to the purchase being imminent, the Company had not made the necessary outlay on capital expenditure to keep the business at its proper level. It was not suggested that the £6 a ton was exaggerated. The other side said: "You are not doing the business now. How can you claim it?" The answer was: "We have done the business, a small business, in recent years." The Company were entitled to say what the business would be if a proper outlay were made. This differentiated it entirely from the hare of mere hypothetical figures. As to deducting the profit of Messrs. Pryce Jones, he submitted that this should not be done, inasmuch as it had been counterbalanced, they heard from Mr. E. H. Stevenson, partly by increased consumption subsequently, and partly by raising the price of gas. Regarding the number of years' purchase, it was agreed that with a non-statutory company of which the prospects were good and the income maintainable, the figure should be 26⅔. The idea that a non-statutory company was less valuable than a statutory company had been pressed a great deal too far. If this had been a statutory Company, he should have asked 28 years' purchase. In recent years, there had been no case of a local authority being allowed to establish gas-works without purchasing those already in existence; and this really gave a non-statutory company quite as sound a position as a statutory one. In one particular they were in a better position than a statutory company, because with a statutory company there was generally a provision as to the price being fixed; whereas in a non-statutory company there was a free hand. But why should he discuss these matters when Mr. Colson, from the other side, admitted 26⅔ years, unless there were special circumstances? He reviewed the facts briefly, contending that there were most hopeful prospects and a rising income, and that therefore the 26⅔ years' purchase should clearly be allowed. As to the rents of the cottages, he admitted that there was a good deal to be said for the argument on the other side that they should be capitalized at less than 26⅔ years. Whether it should be 20 or 18 years, the tribunal must decide. With reference to the 10 per cent., Mr. FitzGerald would hardly suggest that what would be applicable when dealing with the purchase of the London Water Companies—a matter of £40,000,000—was applicable in a case of this sort. He (Mr. Cripps) had never argued that the 10 per cent. was a hard-and-fast matter. The ordinary principle, however, was to allow it; and the question was whether there was any reason to depart from it here. He saw none; and therefore claimed that it should be allowed.

The proceedings then terminated; the award being reserved by the Umpire.

LIBERTY AND PROPERTY DEFENCE LEAGUE WORK.

The above-named League have just issued their eighteenth annual report, the greater part of which is devoted to a record of the action taken by the Parliamentary Committee. Lists of the Bills opposed by the League during the chief session of last year are grouped with short summaries of the proposals and effects involved, according as they affected land and houses, commerce, trade and industry, &c. In connection with the former, special attention is called to the Borough Funds Bill, which was defeated. This Bill, it may be remembered, was to amend the Borough Funds Act, 1872, and the Borough Funds (Ireland) Act, 1888, and enable municipal authorities to spend the ratepayers' money in promoting or opposing Bills without first having obtained their consent. It was introduced by Sir Albert Rollit, and was read a second time with the support of the Government. The League thereupon conferred with the Federated Societies of Property Owners; and, as a result, several pages of amendments were put on the paper, and steps were taken to have them moved when the Bill, as amended by the Standing Committee on Law, came on for consideration. The effect of these amendments was to block the Bill on each occasion that it appeared on the Orders of the Day; and, as the League declined to make any compromise with the promoters, the order for the consideration of the Bill as amended was ultimately read and discharged, and the Bill was withdrawn. But for the action of the League, it would have become law. The report of the Select Committee inquiring into the subject of boiler registration is quoted with satisfaction. The Committee reported strongly against the advisability of legislation; holding it to be of the greatest importance to maintain the responsibility of the boiler-user for the condition and safety of the boiler he works, and believing that legislation giving any Government department control over the inspection of boilers would be a grave mistake, and that State certification of registration, unless accompanied by State control, would not be of any practical value. Considerable assistance was rendered by the League in connection with the various Bills relating to the supply of electricity as well as with the investigation of the question of municipal trading; among the witnesses examined by the Select Committee on the latter subject being several members of the League. The Council close their report by pointing out that during the past year the League did valuable work, and that, by the concerted efforts of the members and federated societies, a great mass of mischievous and predatory legislation was successfully opposed. By securing the co-operation of all persons individually opposed to the principle of State Socialism in all or any one of its instances, and by concentrating into a system of mutual defence the forces of the Defence Associations of the various industries in the country, and of independent companies and corporate bodies, the League seeks to resist all attempts on the part of the State or the Municipalities to restrict freedom of contract and of labour, to harass private enterprise, or unduly to interfere with the rights of property. In carrying on this good and necessary work, the Council invite the support of all persons who sympathize with the sound political and economic principles the League exists to maintain. It is only by vigilant watching and prompt action that many Bills to which property owners take exception are prevented from becoming law.

The New Water-Works for Barnsley.—In connection with the new Midhope Water-Works, the Water Committee recommended the Barnsley Town Council last Tuesday, upon a report by Mr C. Hawksley, to construct the service reservoir at Wortley instead of Woodboro' Common, and to lay down pipe-lines (22 inches diameter mains) from Deepcar to Wortley and from Wortley to Barnsley. The reservoir, it was stated, will be 1700 feet above sea level; and the cost of the pipe-line will be £28,500.

Chard Water Supply.—At the meeting of the Chard Town Council a few days ago, a letter was read from the Chard Land and Investment Company acknowledging the receipt of the Town Clerk's letter conveying to them an explanation of the charges made against the Company by certain members of the Council, and stating that the Company were now prepared to proceed at once with the scheme for procuring a water supply for the borough from Combe St. Nicholas. Mr. Gawler proposed that the Council request the Company to proceed with the scheme, and to furnish an estimate of the cost of the works. On the vote being taken, five voted for the motion, and five against it. The Mayor's casting vote carried the resolution.

Extra Payments to Salaried Officials.—At the meeting of the Pennybont Rural Council last Saturday week, the Clerk read a letter from the Local Government Board concerning the loans of £2250 and £1350 for the purpose of proceeding with the scheme of water supply for Pyle and district, on the understanding that no payment be made to any salaried official under the Board. It was decided that the Clerk write to the Local Government Board asking whether Mr. Hurley, the Engineer of the project, would be regarded as a salaried official. It was also decided to borrow from the Public Loan Board £6000 within four months, and a further sum of £2000 within twelve months, to be expended on water-works at Tondu, Cefn Carvan, and Ynisawdre.

West Gloucester Water Company's Extensions.—A new engine-house and pumping-station has been completed at the Frampton Cotterell Works of the West Gloucester Water Company; and the engines were formally brought into service on Monday last week. On the occasion those present were addressed by the Chairman (Mr. Enoch Horton), the Engineer (Mr. E. D. Marten), and others The new works will give a greatly increased supply at a less cost. The Company have laid about 117 miles of mains, which practically cover the populous parts of their district. The system reaches a population of 60,000, of which 38,000 are supplied; so that there is a good margin for development. The capital expenditure to date is about £170,000; and the estimated revenue is £7500 per annum. Regarding the new works, the engine is a triple-expansion, surface-condensing one, with overhead cylinders of the marine type, and will raise 1½ million gallons of water in 24 hours, and force it to the high-level service reservoirs at Kingswood Hill, about 6¼ miles away. The boilers are in duplicate, of the Lancashire type, 7 feet in diameter and 25 feet long.

METROPOLITAN WATER COMPANIES' REGULATIONS.

GUILDHALL, WESTMINSTER—Monday, Feb. 11.

(*Before Mr.* C. PERRIN, M.Inst.C.E., *Chairman, Mr.* T. THOMSON, M.D., *Barrister, and Mr.* E. A. S. FAWCETT, Assoc.M.Inst.C.E.)

To-day an inquiry was opened, by direction of the Local Government Board, into certain regulations for the prevention of waste and misuse of water which had been prepared by the Metropolitan Water Companies and submitted to the Department for approval.

The parties interested were represented as follows: Mr. CRIPPS, K.C., Mr. CLAUDE BAGGALLAY, K.C., and Mr. HORACE AVORY, for the Companies; Mr. G. M. FREEMAN, K.C., and Mr. G. J. TALBOT for the London County Council; Lord ROBERT CECIL, K.C., and Mr. DANCKWERTS, K.C., for the Corporation of London; Mr. MANISTY for the City of Westminster; Lord R. CECIL for the Middlesex County Council and the Local Authorities of Middlesex not separately represented; Mr. C. C. HUTCHINSON for the Corporation of West Ham; and Mr. E. J. NALDRETT for the Essex County Council. The following Local Authorities were represented: The Metropolitan Boroughs of Battersea, Bermondsey, Bethnal Green, Camberwell, Croydon, Finsbury, Fulham, Hackney, Hammersmith, Hampstead, Holborn, Islington, Kensington, Lambeth, Marylebone, Paddington, St. Pancras, Shoreditch, and Wandsworth; the Urban District Councils of Bromley, Chiswick, Ealing, Hampton Wick, Heston and Isleworth, Hornsey, Leyton, Tottenham, Walthamstow, and Willesden; and the Rural District Councils of Bromley and Sevenoaks. A number of Industrial Dwellings Companies were also represented.

Mr. FREEMAN said he had a preliminary objection to make regarding a matter which had been very carefully considered by the London County Council and several other authorities. Shortly, it was whether the Court, as constituted, was capable of entering on this inquiry at all. His submission was that all the Local Government Board could do was themselves to hold the inquiry, with the assistance, if they so desired, of an engineer or another person whom they might call in. But there was no authority, under the Acts as they now stood, to delegate the powers to hold this inquiry to such a Court as was now about to sit.

The CHAIRMAN said the Local Government Board had taken the opinion of Counsel on the point, and they were advised that they were entitled to appoint the present Court.

Mr. FREEMAN asked that a note of the objection should be taken.

Lord ROBERT CECIL supported Mr. Freeman's contention.

The CHAIRMAN said he would make a note of the point.

Mr. CRIPPS, in opening, said he represented the eight Water Companies of the Metropolis; and although there was a good deal of opposition so far as numbers and weight were concerned (because the Water Companies recognized the right of the County Councils and Municipalities to be heard on an important topic of this kind), yet when they came to see what the points of difference were, and what was the real meaning of these regulations, he hoped the inquiry might not be very prolonged or very minute. The Municipal Authorities seemed to have thought the Companies were bringing forward these regulations to place themselves in a better position as regarded certain ultimate matters than they would be if the old regulations remained in force. He need hardly say no such motive had actuated the Companies. They merely put their case on a business ground; and it was perhaps wonderful that it had not been necessary earlier to bring forward these regulations for amendment, seeing that they were made in 1872. As a fact, the Companies tried to amend them when the two-gallon flush inquiry took place in 1895; but the Local Government Board declined to allow this to be done. The proposed regulations, which related to the waste and misuse of water, did not concern the Companies chiefly, but were of perhaps greater importance to the consumers than any other class of persons, because undue waste by particular consumers tended, not so much to the injury of the Companies, as to the injury of other consumers. The Companies were present in fulfilment of a statutory duty thrown upon them by section 17 of the Act of 1871. Counsel proceeded to review what appeared to the Companies to be the existing conditions, having regard to the Acts of Parliament and the various inquiries held. The General Act of 1847 provided for cisterns where the supply was not constant; and the Special Acts of each of the Companies provided for cisterns whether the supply was constant or not. Then, under the Act of 1852, it was clear that, where there were cisterns, it must be within the competency of the Local Government Board, if requested to do so by the Companies, to frame regulations so that the cisterns should not allow of the waste or misuse of water. The contest would not be as to the power to regulate cisterns in regard to waste, but as to the power of the Court to compel parties to put cisterns in where they did not exist. Then, under the interpretation clause of the Act of 1871, the term "fittings" was made to include cisterns. So that clearly the Court could regulate all cisterns. A matter which had raised a good deal of opposition was the regulation under which an owner or occupier had to provide from time to time the prescribed fittings, and keep the same in repair. As to many of the proposed regulations, the same question would crop up as arose in 1872—namely, whether they should be retrospective or not. A large number only applied to future fittings; and where the regulations were to be retrospective, it was only in regard to matters which were clearly raised in 1872. From that year, when the existing regulations were framed, nothing material happened until 1895, when two inquiries were held by Colonel Ducat—one into the matter of the two-gallon flush, and the other into the alleged failure of the East London Company. In the report on the latter, the Commissioners said:

On behalf of the Water Company, it was urged that if powers were given to them with regard to fittings, similar to those conferred upon a number of corporations in the country, it would be possible very materially to reduce in the future the waste which ordinarily takes place within their district. Incidentally, we would here refer to the advantage to the consumer of having a small storage of water in every house. It was shown that, throughout this scarcity, persons occupying houses provided with cisterns suffered no inconvenience. No doubt ill-designed and badly-placed house cisterns are open to objection from a health point of view; and nothing could be further from our intention than to advocate any return to the old defective cisterns, with

their moveable wooden covers. But we do advocate the provision of properly designed cisterns.

This was exactly the position which the Companies took up in the regulations. As to the two-gallon flush, he did not think there would be any prolonged discussion now, having regard to what took place in 1895, when Colonel Ducat refused to sanction the alteration from two to three gallons, and suggested that the smaller matter of the definition of water-closets might stand over till the whole of the alterations in the regulations, which might be found necessary had been decided on. A very important matter was the final report of Lord Llandaff's Commission on the Metropolitan Water Supply, because this report seemed to render unnecessary a great deal of evidence and discussion which the Companies might otherwise have had to bring before the Court. Counsel proceeded to quote this report at length, to the effect that the quantities per head supplied by each Company varied enormously, and that a great deal of this excessive supply was due to waste. The New River Company had carried the waste-water meter system further than the other Companies, and had induced 95 per cent. of the houses supplied to adopt fittings tested and stamped by the Company. By these two methods, they had achieved a remarkable result in preventing the waste of water, which had not harmed, but had benefited, the consumers. Here he found no extreme opposition by the London County Council to the proposal that the fittings should be properly regulated. The report further stated that in some cases the waste proceeded from wilfulness and neglect; from taps being left running all night, and even from taps being removed; and in many instances also from imperfect fittings. The Commissioners went on to concede that the regulations of 1872 had proved insufficient in practice. The London County Council had power to require an occupier to provide proper fittings; but they had never used this power. The Commission also reported that the Companies might properly be empowered to require that all fittings should be approved and tested by themselves, and renewed or repaired from time to time on their requisition, and brought into conformity with regulations properly framed. There appeared to be jealousy on the part of some Local Authorities as to giving these powers to a trading Company; but the Commission saw no ground for opposing it. The Companies, they said, had been remiss in not proposing a change before now. To this, he (learned Counsel) could only remark that they did try to re-open the whole matter in 1895. Then they said:

> We are of opinion that the Company or body which supplies water, whether the supply be constant or intermittent, should have power to require that a properly constructed cistern, approved by them, of dimensions proportionate to the number of persons likely to inhabit the house, should be placed, and should remain in good order and repair, in any house supplied with water, and should further have power, if the cistern is removed or is out of order, either to cut off the supply of water to the house, or to replace or repair the cistern, at the expense primarily of the occupier, and ultimately at the expense of the owner of the house. The Local Authorities, as guardians of the public health, should be empowered to see that cisterns are properly cleansed, or that their construction is modified so as to prevent fouling of the water; but they should not have power to order the removal of a cistern altogether, unless it is at once replaced by another.

Nothing could be stronger than this. The opponents of the regulations were likely to contend that the Local Government Board had no power, as a matter of regulation, to insist on the provision of cisterns. This was a fair matter for discussion; but he did not understand why they should object to the proper regulation of cisterns where cisterns were already provided. One question of principle upon which discussion would probably arise was as to whether, within the limitations and powers of the various Acts, the Companies ought to have some further authority for preventing the waste and misuse of water. He imagined opposition could only be offered on one ground—viz., that these regulations were brought forward because, if purchase occurred, they would place the Companies in a better position. There was no foundation for this. The Companies were under a statutory obligation to make and submit regulations to the Local Government Board for approval. Whether what was proposed was justified or not, it would have to be conceded that the time had come when some alteration must be made in the regulations to meet the public evils and scandals referred to in such striking language in the report of Lord Llandaff's Commission. He thought consumers had been somewhat alarmed as to the expense which might be thrown upon them. But a large number of the regulations were not retrospective; and one was to the effect that all existing fittings which were sound and efficient should be deemed to be in accordance with the new regulations, so that it was only when the fittings became inefficient and out of repair, and had to be superseded by new ones, that they must be replaced in accordance with the new regulations. The only other point of principle was as to whether the power of stamping fittings should be given the Companies. The New River Company already had an arrangement for stamping their fittings; and in the report of Lord Llandaff's Commission, it was stated that power to do what had been done voluntarily by the New River Company might very fairly be conferred upon the Companies generally. This was the position he should ask the Court to take up. In conclusion, he dealt with the proposed regulations seriatim and explained in what they differed from the existing ones.

Mr. *H. C. B. Bowles*, a Governor of the New River Company, examined by Mr. BAGGALLAY, said he acted as Chairman at the meetings of the Chairmen of the eight Water Companies which took place from time to time. For some years before the 1895 inquiry into the two-gallon flush question, it had been the anxious desire of the Directors of the Companies that the regulations should be inquired into, with the object of making alterations to prevent waste.

Mr. BAGGALLAY: Is there any foundation whatever for the suggestion that the Water Companies have only put forward these proposed regulations now because they want to enhance the values of their undertakings in the event of purchase?

Witness: I never heard of such a thing. It is quite new to me. I only looked to the interests of the public and of the consumers.

Examination continued: Shortly after Colonel Ducat's inquiry, Lord Llandaff's Commission was appointed; and as soon as the report of the Commission was issued, the Companies' Engineers received instructions to amend the regulations.

Cross-examined by Mr. FREEMAN: The regulations would be of great value to the Companies if they saved water; but it remained to be seen whether this would improve the value of the Companies.

Mr. FREEMAN: Has it ever occurred to you that if you want somebody to do something for your benefit, it is not altogether unreasonable that you should pay for it?

Witness: Well, that is rather a large question to answer. I do not see how the consumers are going to be put to much expense, because if the fittings are out of order their landlords, or whoever has to look after them, will have to be at the expense of putting them in order. Witness agreed that if the Companies required the consumers to do something entirely for the Companies' benefit, the latter should pay. He did not think the regulation requiring a cistern to be erected with a storage capacity of 25 gallons for each room would be enforced.

Cross-examined by Lord R. CECIL: The expense of providing cisterns—which in the case of a house of 20 or 30 rooms would be large, and might require a structural alteration of the house—would fall on the consumer. As to the size of the flush, he found that, with a proper pan, 2 gallons was sufficient. He agreed that, with some pans, 2 gallons was not enough. The pans should be altered at the consumers' expense, rather than a three-gallon flush supplied.

Westminster Town Hall—Friday, Feb. 15.

Mr. BAGGALLAY, on the parties assembling, said before he put Mr. Bowles back for further cross-examination, he wished to inform the Court that, since the adjournment, the advisers of the Associated Water Companies had carefully considered the regulations; and, with a view to giving effect to suggestions which Mr. Cripps made in his speech, and to meet so far as possible any objections to the original proposals, the Companies had revised the regulations. Copies had been supplied to the parties showing (in red ink) the alterations. These alterations were not necessarily final; and the Companies would still be ready at any time to consider fair criticism of the proposals, because, while the Companies desired to make the regulations effective, they wished them to be reasonable, and to avoid, so far as possible, putting on anybody, particularly consumers, any undue expense.

Mr. *Bowles* was then re-called.

Mr. MANISTY: Assuming a tenement—a house or a flat—complies now with the existing prescribed regulations in every respect, is that tenement to be exempt or not from the operation of these new regulations?

Witness: Provided they have cisterns in these houses; if they are not of sufficient capacity, it is to be referred to the proper authority to determine whether the amount is sufficient or not.

It means that a tenement that satisfies the requirements of the existing regulations is nevertheless to come under the operation of the new regulations as regards a cistern, if it has not a cistern there?—I fancy the regulation is sufficient to cover it.

Mr. BAGGALLAY: You may take it from me, Mr. Manisty, that if there be no cistern at all for the storage of water, the intention is that there shall be one. If there is storage existing at the time these regulations come into force, then fresh storage shall not be required if the tribunal is of opinion that the present storage is adequate, though it may not come up to the standard which is intended to be asked for in respect of new buildings.

Mr. MANISTY: The effect of this would be that in London, where, as we know, a large number of tenements have no storage cisterns at all, and in many cases have no space for storage cisterns, there would have to be a structural alteration to comply with the regulations.

Witness: An engineer will most likely be able to answer that better than I can. But in our Company, 95 per cent. of the houses have cisterns already.

Mr. MANISTY: Assuming that the new regulations require new fittings that do not exist now, would those fittings have to be put in under the new regulations, or is a tenement to be exempt?

Mr. BAGGALLAY: If existing fittings are not sound and efficient, and do not comply with the regulations of 1872, they will certainly have to be replaced.

Mr. MANISTY: Do you intend or not to bring existing tenements that satisfy the existing regulation within the operation of the new regulations?

Witness: If the fittings are defective in the houses, they will have to be altered to come under the new regulations. But if they are perfect, they will not be interfered with.

Or added to?—If they want addition they would not be perfect.

If the existing fittings are perfect and satisfy the existing regulations, is that tenement to be exempt from the operation of the new regulations?—If they carry out the intention of the regulations to prevent the waste of water, the tenements will not be interfered with, so far as I understand.

By Mr. GRIFFITHS: He did not know that since 1872 further powers had been granted to sanitary authorities in London to deal with water-closets and water supply.

By Mr. MAYER: It was not intended by the provision of cisterns to abandon the constant supply. The water was to pass through the cisterns to the houses. He did not know that a large amount of dirt accumulated in the cisterns, and that it was due to this that the cisterns were discontinued. If there were dirt, it would go to the bottom; whereas the water would be drawn off from the top. Whether the proposed regulations would prevent consumers' pipes being broken or fractured through frost, depended on the position of the pipes. He should say none of the regulations would have prevented the water famine of 1895.

By Mr. BEVEN: Six-roomed houses, of which there were many in the East of London, would require a cistern under the revised proposed regulations, of 120 gallons, or 1200 lbs. weight. It was suggested that there was absolutely no room in such houses for a cistern, and that the regulation, if adopted, might cause a structural alteration; but he should like to see the houses before he said where the cistern should be placed.

By Mr. GLEN: If powers were given to Borough Councils to make regulations regarding the fittings, he presumed the Local Government Board would see the regulations and harmonize them with those of the Water Companies, and thus avoid the inconvenience of a

double set of regulations in regard to the same matter. The Companies had not consulted the Borough Councils with regard to the regulations.

Mr. BAGGALLAY: They were made before the Borough Councils election last autumn, and were held back for the Councils to have an opportunity of considering them.

By Dr. ROBINSON: He did not know the Shoreditch Sanitary Authority had been ordering cisterns to be removed because they were insanitary; nor that 3300 had been so removed. He considered the authority wrong in so acting. A cistern, when properly cleaned out, did not cause contamination of water. He agreed that it would be an awkward position for a consumer to be between a sanitary authority who directed him to remove his cistern and a water company who subsequently directed him to provide one.

Mr. BARTLEY DENNIS at this point raised the question of whether he had *locus standi* in the present proceedings, as representing twelve or thirteen Industrial Dwellings Companies with a large capital.

Mr. BAGGALLAY objected, chiefly on the ground that only certain representative authorities could appear, and that if Mr. Bartley Dennis were given *locus*, other individual owners would be entitled to appear separately.

Several gentlemen, who said they were the owners of large property which would be affected by the regulations, and outside authorities, such as the Hampton Wick Council, also claimed to be heard.

Mr. PERRIN, after argument on both sides, said the Court had decided to allow Mr. Bartley Dennis, outside local authorities, and individual owners, if they had anything new to bring forward, to appear.

Mr. *Ernest Collins*, examined by Mr. AVORY, said he had been for 20 years Engineer to the New River Company, who were supplying last year a population of 1,245,000 with 31·9 gallons of water per head daily. He, in conjunction with the other Engineers, received instructions from the respective Boards to frame these regulations.

Mr. AVORY: Has the amendment of the regulations any connection at all with the question of the purchase of the Water Companies?

Witness: Not the slightest, so far as I am concerned.

In your judgment, are the amended regulations equally necessary in whosoever hands the water supply might be?—I think so.

In further examination, witness said in the New River Company the system of constant supply came into fairly general operation in 1881; and about that time attention was directed to the fittings. After consultation with manufacturers, he came to the conclusion that if they could establish a standard, and introduce the testing and stamping of these fittings, it would be a great benefit to the Company. The Company since then had gradually altered the regulations as regards weight and dimensions, and had thus derived very great benefit. The Company now had a very fine schedule of fittings, which was generally accepted by the trade. The primary object of the Company was to save waste; but the consumers would benefit by having some definite test, and thus being able to know what they were purchasing. About 95 per cent. of the fittings in the New River Company's district were now stamped; and but for this, the Company would not have been able to maintain the constant supply. The patterns specified in the regulations generally followed the patterns which, by experience, the New River Company had ascertained to be the best.

Witness was then taken seriatim through the proposed regulations. By No. 2, it was made clear that the communication-pipe should be from the main to the cistern. The substantial alteration in No. 4 was the addition at the end that each house in a group should be commanded, independently of any other house, by a stop-valve in a readily accessible position. Where a group of (say) six houses were supplied with one communication-pipe, if there were only one stopcock commanding the six, and if the supply had to be withdrawn because (say) waste was taking place, the Company would have to cut off the whole six. But if each had a stopcock, only one supply need be stopped. No. 5 was entirely new, and was intended to meet a difficulty which had been suggested—viz., that a defect in the communication-pipe might require the whole pipe to be relaid. In No. 6, which provided that no house should have connection with the fittings of any adjoining house, the only alteration was the introduction of the word "cisterns;" the object being to prevent contamination of the Companies' water. In No. 7, which directed the connection to be by ferrule, the real difference between this and the old regulation was the introduction of the words "to patterns approved by the Company." So far from this being likely to give the Water Company a monopoly of this particular trade, as had been suggested, the intention was exactly the opposite, because, by stipulating the weights and dimensions, all manufacturers were enabled to come in; and the result in the past had been to greatly cheapen the cost of the ferrules. Regulation 8 specified the weights and dimensions of the ferrules; these being in accordance with the patterns used by the New River Company. The chief provision of No. 9 was that the exterior pipes, which were to be of lead, should be properly protected against frost, theft, or mischief; and this was to apply to all existing pipes, for the mutual benefit of the Companies and the consumers. In No. 10, the substantial alteration was that pipes inside a building should be accessible, and not embedded; and this was not intended to be retrospective. In No. 11, there were some alterations in the weight of lead pipes to be used; and the pipes were to be sound, and of good metal. No. 12 provided that pipes in exposed situations should be protected "to the satisfaction of the Company, against the effects of frost." In the old regulations, there was no indication as to who was to decide whether a pipe was properly protected. He could not agree to let the Borough Councils decide in case of dispute; they would not know. The only alteration in No. 13 was that, where pipes were laid through drains, &c., they should be passed, not merely through a cast-iron pipe, but through a water-tight cast-iron pipe. In No. 14 an amendment was introduced to ensure that, where the Company supplied water, it should be carried into a cistern of its own, and not into one containing water derived (say) from a well. If the person wished to mix the two, he could place the tank for the Company's water at a slightly higher level, and let the water from it run into the other. Regulation 15 was entirely new; and it carried out the principle that the fittings should be stamped and tested. It was prospective only. No. 16 was for the protection of the consumer, and was

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 456.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 12	10½	Alliance & Dublin 10 p.c.	19—20	..	5 5 0
100,000	10	,,	7½	Do. 7 p.c.	13⅞—14⅛	..	5 3 5
300,000	100	Jan. 2	5	Australian 5 p.c. Deb.	99—101	..	4 19 0
200,000	5	Nov. 14	6	Bombay, Ltd.	6—6⅛	..	4 12 4
40,000	5	,,	6	Do. New, £4 paid	4—4⅛	..	5 6 8
380,000	Stk.	Feb. 14	12	Brentford Consolidated	257—262*	+6	4 11 7
270,000	,,	,,	9	Do. New	182—187*	+3½	4 16 3
50,000	,,	,,	5	Do. 5 p.c. Pref.	128—132*	..	3 15 9
159,375	,,	Dec. 13	4	Do. 4 p.c. Deb.	112—115	..	3 9 7
220,000	Stk.	Sept. 14	10	Brighton & Hove Orig.	220—230	..	4 6 11
226,320	,,	,,	7	Do. A. Ord. Stk.	150—160	..	4 7 6
1,022,500	Stk.	Aug. 29	5	Bristol, 5 p.c. max.	121—123	..	4 1 4
420,000	20	Sept. 28	10	British	39—41	..	4 17 7
50,000	10	Aug. 15	12	Bromley, Ord. 10 p.c.	24—26	..	4 12 4
79,000	10	,,	9	Do. 7 p.c.	19—21	..	4 5 8
500,000	10	Oct. 12	6	Buenos Ayres (New) Ltd.	8¼—8⅜	..	6 17 2
220,000	Stk.	Dec. 28	4	Do. 4 p.c. Deb.	95—98	..	4 1 8
150,000	20	July 12	8¼	Cagliari, Ltd.	23—25	..	6 12 0
100,000	10	Sept. 28	8	Cape Town & Dis., Ltd.	14—15	..	5 6 8
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	53—55	..	5 9 1
550,000	Stk.	Oct. 12	12¾	Commercial Old Stock	277—282	+2	4 10 5
236,425	,,	,,	9¼	Do. New do.	208—213	+1	4 11 7
238,237	,,	Dec. 13	4½	Do. 4½ p.c. Deb.	132—137	..	3 5 8
800,000	Stk.	Dec. 13	9	Continental Union, Ltd.	162—167	+2	5 7 9
200,000	,,	,,	7	Do. 7 p.c. Pref.	160—165	..	4 4 10
575,000	Stk.	Aug. 15	5†	Crystal Palace Ord. 5 p.c.	117—122	..	4 2 0
60,000	,,	,,	5	Do. 5 p.c. Pref.	130—135	..	3 14 1
486,090	10	Jan. 31	11	European, Ltd.	18⅛—19½	..	5 12 10
354,060	10	,,	11	Do. £7 10s. paid	13⅝—14⅝	..	5 13 9
15,079,885	Stk.	Feb. 14	4⅛	Gas-light and Coke 4 p.c. Ord.	96—98*	..	4 9 9
2,600,000	,,	,,	3½	3½ p.c. max.	89—91*	..	3 16 11
3,799,735	,,	,,	4	4 p.c. Con. Pref.	113—116*	..	3 9 0
4,063,425	,,	Dec. 13	3	3 p.c. Con. Deb.	92—94	..	3 3 10
70,000	10	Oct. 26	8	Hongkong & China, Ltd.	13—14	..	5 14 4
3,800,000	Stk.	Nov. 14	10	Imperial Continental	205—210	+2	4 15 3
473,600	Stk.	Feb. 14	3½	Do. 3½ p.c. Deb. Red.	100—102*	+1¾	3 8 8
561,000	Stk.	Aug. 30	10	Liverpool United A	232—234	..	4 5 6
678,100	,,	,,	7	Do. do. B	173—175	..	4 0 0
306,083	,,	Dec. 28	4	Do. do. Deb. Stk.	120—122	..	3 5 7
75,000	5	Dec. 13	6	Malta & Medn., Ltd.	4⅝—5⅛	..	5 14 3
560,000	100	Oct. 1	5	Met. of 5 p.c. Deb.	106—109	..	4 11 9
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	104—106	..	4 4 11
541,920	20	Nov. 14	3½	Monte Video, Ltd.	9½—10⅜	..	6 13 4
667,946	*Stk.	Aug. 30	9¼	Newc'tle & G'tesh'd Con.	224—225	−½	4 2 3
299,855	*Stk.	Dec. 28	3½	Do. 3½ p.c. Deb.	101—102	..	3 8 8

*Ex. div.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment
£			p. c.	GAS COMPANIES.			£ s. d.
150,000	5	Nov. 29	8	Oriental, Ltd.	7—7½	..	5 6 8
135,000	5	,,	8	Do. New, £4 10s. pd.	5⅝—6¼	..	5 15 3
15,000	5	,,	8	Do. do. 1879, £1 pd.	1¾—1⅞	..	4 11 5
60,000	5	Sept. 28	7	Ottoman, Ltd.	5—5⅛	..	6 7 3
851,070	10	Oct. 12	7	River Plate Ord.	10—10½	..	6 13 4
250,000	Stk.	Dec. 28	4	Do. 4 p.c. Deb.	97—99	..	4 0 10
250,000	10	Sept. 28	8	San Paulo, Ltd.	11—12	..	6 13 4
135,000	Stk.	Sept. 14	10	Sheffield A	232—236	..	4 4 9
209,700	,,	,,	10	Do. B	232—236	..	4 4 9
447,427	,,	,,	10	Do. C	232—234	..	4 5 6
5,761,885	Stk.	Feb. 14	5	South Met., 4 p.c. Ord.	132—135*	+½	3 14 1
1,547,965	,,	Jan. 16	3	Do. 3 p.c. Deb.	93—96	..	3 2 6
380,940	Stk.	Nov. 14	5	Southampton Ord.	105—110	..	4 10 11
70,825	,,	Jan. 16	4	Do. 4 p.c. Deb.	105—110	..	3 12 9
120,000	Stk.	Aug. 30	6	Tottenham A. 5 p.c.	113—118	..	5 1 8
250,520	,,	,,	4½	and B. 3½ p.c.	85—90	..	5 0 0
61,550	,,	Dec. 13	4	Edmonton 4 p.c. Deb.	107—112	..	3 11 5
182,380	10	Jan. 16	5	Tuscan, Ltd.	8—9	..	5 11 1
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	97—102	..	4 18 0
				WATER COMPANIES.			
780,499	Stk.	Dec. 28	11	Chelsea, Ord.	297—302	..	3 12 10
150,000	,,	,,	5	Do. 5 p.c. Pref.	155—160	..	3 2 6
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75	142—145	..	3 2 1
175,785	,,	Sept. 28	4½	Do. 4½ p.c. Deb.	143—148	..	3 0 10
1,720,560	Stk.	Oct. 12	7	East London, Ord.	190—195	..	3 11 10
654,740	,,	Dec. 13	4½	Do. 4½ p.c. Deb.	147—152	..	2 19 3
797,687	,,	,,	3	Do. 3 p.c. Deb.	94—96	..	3 2 6
700,000	50	Dec. 13	8	Grand 10 p.c. max.	109—112	..	3 11 5
310,000	Stk.	Sept. 28	4	Junction 4 p.c. Deb.	125—130	..	3 1 7
708,000	Stk.	Feb. 14	14	Kent	298—303*	+2	4 12 5
160,000	,,	,,	7	Do. New, 7 p.c. max.	200—205*	+1	3 8 4
1,043,800	100	Dec. 28	10½	Lambeth, 10 p.c. max.	288—293	..	3 11 8
406,200	100	,,	8	Do. 7½ p.c. max.	208—213	..	3 15 1
350,000	Stk.	Sept. 28	4	Do. 4 p.c. Deb.	125—130	..	3 1 7
500,000	100	Feb. 14	13⅓	New River, New Shares	410—415*	..	3 6 3
1,000,000	Stk.	Jan. 31	4	Do. 4 p.c. Deb.	127—130	..	3 1 7
902,300	Stk.	Dec. 13	7	South-wark Ord.	192—197	−1	3 11 1
126,500	100	,,	7	and 5 p.c. Pref.	155—160	..	3 2 6
489,200	Stk.	,,	5	Vauxhall 4 p.c. A Deb.	125—130	..	3 1 7
1,019,585	,,	Oct. 12	4	West Middlesex	280—290	..	3 9 0
1,155,066	Stk.	Dec. 13	10	Do. 4½ p.c. Deb.	140—145	..	3 2 1
200,000	,,	,,	4½	Do. 3 p.c. Deb.	97—99	..	3 0 7
200,000	,,	Sept. 14	3				

*Ex. div.

† Next dividend will be at this rate.

to secure that there should be the full waterway through the pipes. No. 17 provided that there should be a stop-valve outside the premises, which would be for the convenience both of the Company and of the consumer. By having the stopcock at the outside, the Company, in case of a break in the pipe, would immediately be able to localize it, which could not be done if the stopcock was inside the house. Moreover, if the stopcock were inside and a burst occurred between the stopcock and the main, water would flow into the premises and cause much damage; and the consumer would have no means of shutting it down without applying to the Company. No. 18 specified the weights and dimensions of stop-valves, draw-taps, and bath apparatus, and was entirely new; being from the New River Company's existing schedule. No. 19 applied to the provision of cold-water storage cisterns; the quantity for each room having been altered from 25 to 20 gallons. It was entirely new. It was necessary that every house should have a certain amount of storage, for the convenience of consumers in case mains were shut down, or in the event of accident. When there was severe frost, it was often impossible to maintain the constant supply, owing to breakages in mains; and then the cisterns would be very useful, as they could be filled when the supply was turned on for (say) half-an-hour. With cisterns, also, there was less waste. For instance, in Shoreditch, where the cisterns had been removed owing to the act of the sanitary authorities, the people had used half barrels as cisterns, and kept the water running into them. If a cistern were kept covered, it would not often want cleaning. The minimum allowance should be 20 gallons for each room; and the Companies would not object if the capacity were increased. The regulation had been altered from its first form to meet the case of flats, where, now, there would probably be a series of cisterns, instead of one huge cistern as originally proposed. With regard to No. 22, which related to the character of the cisterns, the main alteration was that the cisterns were to have a close-fitting lid, instead of being "properly covered;" and this was to be retrospective, in which there would be no hardship. Further, the cistern was to be placed in such a position that it might be readily inspected and cleansed. No. 23 was new, and applied only to future cisterns. The object was to prevent them being placed outside the buildings, and that there should be a clear space over the top so as to allow of efficient and ready cleaning. The wording of No. 24 was altered to secure that the ball-valve in a cistern should be properly fixed; and there was no reason why this should not apply to existing as well as to future cisterns. Also it was provided that the water was not to be allowed to rise to within 2 inches of the lower side or warning-pipe. No. 25, which related to ball-valves, and gave their weight and dimensions, was entirely new, and was intended to be prospective as regarded new houses, and retrospective as to repairs. The schedule of weights and dimensions was an exact copy of those enforced by the New River Company. In No. 26, which said waste-pipes were to be removed or converted into warning-pipes, the words "at the option of the consumer" were now omitted, so that one thing or the other must be done. In No. 27 the substantial alteration was the introduction of the provision that the warning-pipe should, "where reasonably practicable," be placed outside the house, in a position to be seen by the officer of the Company. Without the provision, "where reasonably practicable," it could not be carried out. It was a great advantage to have it outside. Most consumers liked to have it there; and it showed quickly when anything was in fault. The substantial alteration in No. 32 was that every boiler was to be supplied through a separate covered feed-cistern; this, in its turn, being supplied from a storage cistern. The feed-cistern referred only to low-pressure boilers. There was nothing in the objection of the County Council, who saw no reason why more than one boiler should not be connected with one feed-cistern of sufficient capacity. They were confounding high-pressure hot-water apparatus with low-pressure boilers.

Witness had not concluded his examination-in-chief when the proceedings were adjourned till yesterday (Monday).

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Edinburgh and Leith Gas Commissioners walked through the report of their Works Committee (given in last week's "Notes") regarding the wages and engagements of their workpeople. The various clauses which were disputed were moved and voted upon with almost no remark. When the first of these was before the meeting, Sir Andrew M'Donald, in moving it, reserved to himself the right to reply; and after disapproval had been moved, he was proceeding to give his reasons for the course he was recommending, when he was called to order by Bailie Waterston, who contended that as nothing had been said there was nothing to reply to. The vote was taken, and resulted in the Committee's recommendation being carried by 13 votes to 6. The question of Sunday labour will thus not be considered until after the new gas-works at Granton are opened. On the next clause, the Commissioners, by a similar vote, agreed to give the men time-and-quarter pay for overtime till 10 o'clock at night, and time-and-half pay after that; the reason being that men then began to lose their sleep. With regard to extra labour by retort-house hands within the ordinary eight-hour shift, Bailie M'Kelvie moved that the wages for such should be one-half more than was at present allowed, and Mr. Mallinson seconded. Provost Mackie moved the approval of the report, on the ground that when one man was off the others got extra pay; the man's pay being divided among those working. On a division, 12 voted for approval and 7 for the amendment. The other points in the report were agreed to unanimously. Then the Clerk read a letter from Mr. W. Blackwood, the Secretary in Scotland for the Gas Workers' Union, in which he acknowledged the intimation that the Commissioners were to meet to consider the subject of the men's demands, and expressed the hope that the result would be favourable to the men. He subscribed himself "Yours fraternally;" and at the expression, the Commissioners laughed an ironical laugh. But the laugh should be on the other side; for the

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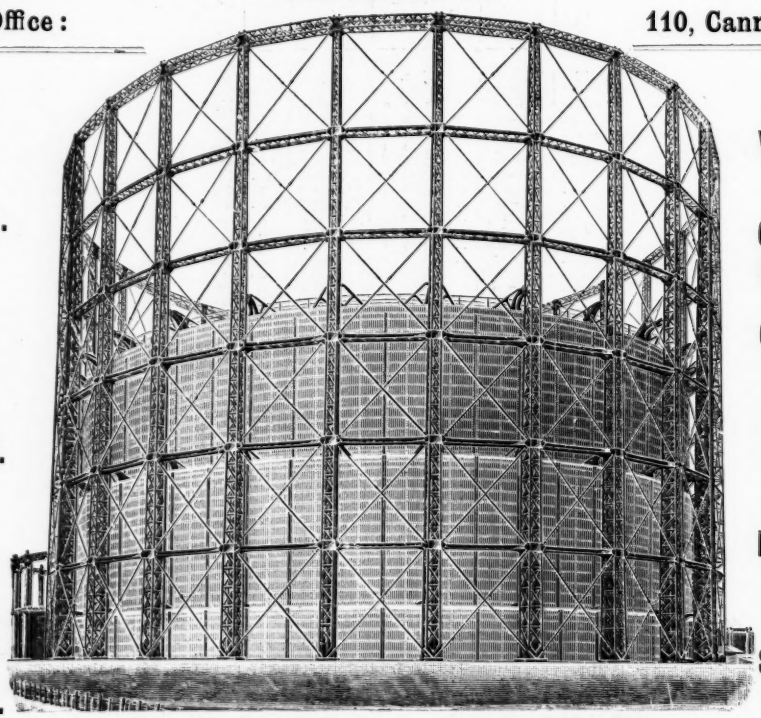

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GASHOLDERS.

Commissioners have fraternized with Mr. Blackwood, and why should he not remind them of the fact? Apparently he does not wish them to forget it. There has been no indication as yet as to whether the men are satisfied or not with the new terms. I suppose they, or those of them who belong to the Union (which I quite believe to be only a small fraction), will be waiting for instructions from Mr. Blackwood.

The Finance Committee of the Greenock Corporation have agreed, by a majority, to ask that power be taken in a Provisional Order which is being promoted, for the increase of the borrowing powers of the Gas Trust by £100,000. The expenditure of this sum is proposed as follows: £20,000 upon a new gasholder, £15,000 upon a main from the works to Cathcart Square, £6000 upon retort-benches, £8000 for purifiers, £4700 for other plant, and £14,000 for contingencies. There is already a sum of £15,000 over-borrowed, which will have to be wiped out. Thus £82,000 of the new loan will be disposed of at once; and the balance will be found to be not too large to work upon.

The Town Council of Perth discussed at great length, on Monday night, the proposals of the Works Committee with reference to the furnishing of gas fires and cookers. The principal suggestion was to adopt a system of hire-purchase, in addition to the present plan of simply hiring. It has been found that, in hiring only, the return of capital is slow; and it is anticipated that when apparatus is sold, this will be accelerated. But it was not over this proposal that the members had a difference of opinion. It was upon the continuance of an arrangement whereby the whole of the apparatus sent out is furnished by one agent in the town. In other words, it was a fight for vested interests that was witnessed. How easily such an interest is created. It was only in 1894 that the Gas Commissioners entered upon the business of gas-stove hiring; and they then began to deal with a gentleman who had opened an establishment in the city. Some say that there was an agreement; but no one can find it in the minutes. But whether there was an agreement or not, the practice has been to give the agent half the commission allowed by the makers, and to pay him for his services in fitting up the apparatus. In the view of some, the business was the agent's, not the Commissioners'; but the Commissioners found the capital for it, and it was the agent who reaped all the profit. In the view of others, the agent had worked up the trade, and it had been of immense benefit to the gas undertaking; the consumption of gas having gone up by 60 million cubic feet. In the opinion of these gentlemen, it was a hardship to the agent to have his services dispensed with. The Council, by 16 votes to 7, adopted the recommendations of the Committee. I think that, on a balance of considerations, they did right. It is not a necessity of the situation that the agent be thrown out of employment; but he will become subordinate to the Gas Manager, and will be obliged to obey his orders. In other words, the new arrangement will remove the anomaly of there being two independent authorities dealing with the gas-stove business. Mr. M'Lusky will, in future, be the sole Manager of the department; and, in addition to the fact that he will get his own way in all things relating to the business, there will be a saving to the Corporation.

Mr. A. Waddell, Engineer to the Dunfermline Gas Commissioners, this week recommended them to adopt benzol as an enricher for their gas, in preference to shale. The present method, he said, produces about 2000 tons of rubbish a year, which it is difficult to get rid of. He estimated the cost of plant for the benzol process at about £280, and that by its use, after allowing 5½ per cent. for interest and sinking fund, there would be a yearly saving to the Commissioners of £599 17s. The Gas Committee had very carefully considered the proposal, and had recommended the Town Council to adopt it, which they unanimously did; suspending the standing orders to enable them to do so. There are some corporations it must be a pleasure to work with.

The Carnoustie gas-works transfer has been moved forward a step this week. On Wednesday evening the Town Council resolved to adjourn consideration of the matter till March 13; but yesterday Mr. A. Yuill, of Alloa, who had been called in by the Directors of the Company, visited Carnoustie, and inspected the works and plant. He afterwards had an interview with the Directors, and submitted his report to them. In his opinion, if arbitration were resorted to, the price might go as high as £17,000; and he considered that the offer of the Company to sell their undertaking for £12,000 was so reasonable that the Town Council would make a great mistake if they refused it. The mains he found to be in a condition almost as good as new, although they have been in the ground for nearly 40 years. There is great deficiency of storage accommodation; but even after making provision for this, the present profits could be well maintained, the price of gas being about 2d. per 1000 cubic feet less than it is in a number of similar gas undertakings in the country. The Directors unanimously adopted Mr. Yuill's report, and ordered a communication to be sent to the Town Council to the effect that they are prepared to recommend the shareholders to sell the undertaking at £12,000.

The latest place where the public authorities have been smitten with a craving to acquire the local gas undertaking—and its profits—is Bo'ness. At a meeting of the Town Council this week, Mr. Calder moved that negotiations be entered into with the Bo'ness Gas Company for the purchase of their works; and failing an agreement on reasonable terms, the matter be brought before the Council with a view to getting powers to start an opposition gas-works. Mr. Grant moved the previous question. It seemed to him a very risky experiment to acquire gas-works in these days of successful electric lighting. After much discussion, it was resolved that the Lighting Committee communicate with the Gas Company, and ascertain upon what terms they would sell their undertaking.

On Wednesday evening, a discussion on "The Recent Rise in Coal Prices" took place at a meeting of the Economic Science Section of the Philosophical Society of Glasgow. The opening speaker was Bailie D. M. Stevenson, who is himself a coal merchant. His remarks remind me of the advice which the distinguished novelist gives to Coningsby—*i.e.*, to "say a good deal about nothing." Bailie Stevenson pointed out that Scotland had a very much larger share of the increased export trade last year than either England or Wales; and he came to the conclusion that they would have a very much greater backset when the time came. In his opinion, the main reason for the rise in prices

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was simply the very active state of trade both at home and abroad; and the moment the activity began to give way, they would find that the equilibrium would be restored, and that they would perhaps see the balance on the wrong side. The remarkable spell of prosperity which shipowners had had, and which was quite unprecedented both in extent and duration, was completely over; and he thought he was right in saying that freights to-day were lower than they had been for something like eight or ten years. There is something charmingly innocent in the expression that the balance may be on "the wrong side." Of course, he means the wrong side for the handful of coal merchants, and is apparently altogether oblivious to the circumstance that what he is pleased to regard as the wrong side would be the right side for 99 per cent. of the community.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 16.

Sulphate of Ammonia.—The firmer market at the close of last week has quite disappeared, though quotations remain £10 15s. to £10 18s. 9d. per ton, delivered f.o.b. at the ports. Makers are not, however, burdened with stocks; and there has not been much anxiety to press sales. On the other hand, the severe weather has discouraged buying on the part of consumers; and, as they have not been much in evidence, the market has been left mainly to middlemen. The forward position has also been neglected; makers being firm at £11 5s. per ton over spring months, and buyers being unwilling to pay this price.

Nitrate of Soda is just steady at 8s. 4½d. per cwt. to 8s. 7½d., according to quality.

LONDON, *Feb.* 16.

Tar Products.—The depression in benzol which has been rather noticeable during the last two months appears to be passing away. There is now more inquiry, and values may improve. Nineties, however, seem to be more in demand than fifties; while toluol, which during the past year enjoyed an exceptionally good market, is to-day realizing much less money. Pitch continues more steady, although most makers are fully sold, and will not be able to take advantage of the slightly better price which is mentioned for delivery during the remainder of the season. Tar oils are still a drug; and anthracene continues dull, while creosote salts are moving off freely on contracts.

The average values obtaining during the week are: Tar, 13s. 6d. to 17s. Pitch, east coast, 32s. 6d.; west coast, 28s. 6d. Benzol, 90's, 11d.; 50's, 10d. Toluol, 1s. Crude naphtha, 4d. Solvent naphtha, 1s. 1d. Heavy naphtha, 11d. Creosote, 1d. Heavy oils, 2d. Carbolic acid, 60's, 2s. 6d. Naphthalene, 90s. to 95s; salts, 65s. Anthracene, "A," 3d.; "B," 2d.

Sulphate of Ammonia.—This market has been somewhat slack during the week; buyers apparently holding off in the hope of lower prices. Business has been done at £10 17s. 6d. to £11 per ton, less 3¼ per cent., according to port, while for forward delivery probably 3s. more would be paid.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—The renewed spell of severe weather may possibly check temporarily the downward move in house-fire coal prices which in some quarters was becoming imminent; but otherwise the situation remains practically unchanged. A very unsettled tone is coming over the market with regard to all other descriptions of fuel; and a substantial easing down in prices has already commenced, and would seem likely to continue. There is nothing as yet coming forward in the shape of inquiries to test the prices that may probably rule for gas and locomotive contracts; but among representatives of some of the largest collieries there is evidently an anticipation that a reduction of about 2s. 6d. per ton on last year's prices may be found necessary. A great deal, however, will depend upon the course of the market during the next couple of months, and the pressure of the competition from other districts. It has previously been intimated in these reports that in all probability there will be a complete break-up of the understanding which during the previous two seasons has existed between the Lancashire and Yorkshire coalowners, with regard to the gas coal and locomotive fuel contracts; and if the market is opened to free and unrestricted competition, it is scarcely possible just at present to forecast at all accurately what the result of this may be. The position, however, will be altogether different from that which obtained last year, and in every respect favourable to buyers. In common round coals, for ordinary steam and forge purposes, prices have been easing down steadily for some time past. It would only be in special cases that much more than about 11s. 6d. per ton at the pit could be got on open market sales. Engine fuel is perhaps easing down still more rapidly, owing to the excessive keenness of competition from other quarters. In the face of slack to be bought readily from Derbyshire and Staffordshire at from 5s. 6d. per ton at the pit, and from Yorkshire at from 6s. up to 8s. for the better qualities, Lancashire collieries have necessarily been compelled to come down under recent quotations; and 8s. 6d. to 9s. per ton are now the full average figures for ordinary qualities of Lancashire slack, with some of the best sorts still quoted at about 10s. The shipping trade has been easing off rapidly; and prices for steam coal, delivered at the ports, have now got down to about 13s. and 13s. 6d. for ordinary qualities, with only special sorts fetching much above these figures. For coke the position continues very irregular. The Lancashire makers of best foundry cokes have not further reduced their list basis, but are having to meet an exceedingly keen competition from the North of England; and it is becoming more and more difficult to maintain their prices. On furnace qualities, the extremely low prices at which Yorkshire unwashed cokes can be bought—namely, about 11s. to 11s. 6d. per ton at the ovens—is bringing down quotations for the better-class washed Lancashire cokes, which are nominally about 15s. per ton at the ovens.

Northern Coal Trade.—There is a slightly better tone in the coal trade of the North, which may be in part due to the colder weather increasing

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the demand for gas and household coals; but it is also partly owing to the giving out of some contracts usual at this time of the year, which are large enough to define the values in some degree. Best Northumbrian steam coals are now quoted at 10s. 10½d. per ton f.o.b.; and at this price they are steady. Steam smalls are 5s. The large contracts for the Swedish State Railways have been settled at rates that allow about 10s. 10d. per ton f.o.b., after the usual deduction for freight. The gas coal trade is rather easier; the demand now showing the fall that is common as February nears its end. The price of Durham gas coals varies from 10s. to 10s. 6d. per ton f.o.b.; but in a week or two some contracts may show the rates better than the current quotations. The coke trade is duller, and prices are generally easier. Best Durham coke for export is 17s. per ton f.o.b. and blast-furnace coke is about 14s. 6d. at the Teesside furnaces. Gas coke varies much in price—probably influenced by the stocks the different companies may have. From 14s. 6d. to 16s. per ton may represent the medium quotations.

Scotch Coal Trade.—There is practically no change in the coal trade The complaint of the Scotch coalmaster is that he is being undersold by his rival in the North of England. Prices, therefore, do not advance. The quotations are: Main 10s. to 10s. 3d. per ton f.o.b. Glasgow, ell 10s. 9d. to 11s. 9d., and splint 11s. 6d. to 12s. The shipments for the week amounted to 175,014 tons—an increase of 63,481 tons upon the previous week, but a decrease of 19,566 tons upon the corresponding week of last year. For the year to date, the total shipments have been 854,698 tons—a decrease of 140,104 tons upon the same period of last year.

London County Council and Proposed Gas Legislation.—At the meeting of the London County Council last Tuesday, it was resolved to oppose the Bills promoted by the Gaslight and Coke and South Metropolitan Gas Companies, and to charge the expenses upon the county fund. The report of the Parliamentary Committee dealing with the proposals contained in these Bills, to which reference was made last week (p. 413), was received.

Sheffield Master Plumbers and the Water Committee.—At the meeting of the Sheffield City Council last Wednesday, a memorial was received from the Master Plumbers' Association. It showed that the Association strongly protested against the action of the Water Committee in giving way to the demands of the operative plumbers independently of the master plumbers (*ante*, p. 420), and the reason for so doing as reported in the newspapers. They exonerated the General Manager (Mr. W. Terrey) from intentionally misleading the Committee, but added that he had allowed himself to fall into very serious errors. He accused the employers of turning round and adopting an unreasonable attitude after having agreed to the alteration of rules. Having failed to get the parties to agree to arbitration, the employers thought that it would have been only courteous if Mr. Terrey had informed their representatives of his intention to ask his Committee for authority to arrange with the men on these grounds before doing so. At this point the reading of the memorial was interrupted, and it was referred to the Water Committee.

Soft Water and Defective Bone Formation.—At the 41st annual meeting of the Dental Hospital, a statement was made to the effect that Birmingham is likely to want a great many dentists shortly. Emphasizing the necessity of a new hospital, one of the speakers said that since Glasgow had had its water from Loch Katrine, dental caries and rickets had largely increased in the city. It appears that in South Africa the same effect of using soft water has been observed among the natives.

Gibraltar Water Supply.—Four huge reservoirs (says the "Regiment") have been cut out of the side of the rock of Gibraltar, and are capable of storing some 5 million gallons of water, which, in the event of siege, would be invaluable to the garrison. Each tank, by means of wire gauze, can be made mosquito-proof; thus preventing this pest, prevalent in the hot weather, from introducing any germs of disease. The poor will greatly benefit by the new scheme; and the health of the troops will certainly improve by the fresh water supply.

Wells Water Supply.—A statutory meeting of ratepayers and owners of property in Wells have authorized the City Council to proceed with their opposition to the Bill promoted by the Wells Water Company for re-incorporating the Company and enlarging and improving their works. This was a necessary consequence of the poll of the city, which favoured very strongly the Bill of the City Council to acquire the undertaking. Meanwhile, the Union Authorities are cutting themselves adrift from both Water Company and Council, and are preparing a scheme for supplying the workhouse with water from their own property, where there is reason to believe they have abundance for all purposes.

Newport (Mon.) Gas Workers Invited to Become Stockholders.—At the annual dinner of the Newport Gas-Works Benefit Society, held on Monday last week under the presidency of the Engineer and Manager (Mr. T. Canning, J.P.), Mr. Herbert Canning, in giving the toast of "The Chairman and Board of Directors," remarked that for many years the Company had granted the men half-time pay when they were sick. Now the Chairman (Mr. R. Laybourne, J.P.) had put before the Board a plan for the workmen to become holders of stock in the Company; and he proposed to accompany it with a species of savings bank scheme, to enable the men to takeadvantage of the proposal. The Chairman, in acknowledging the toast, gave some details of the scheme. With reference to the savings bank, the Directors would take notice of the rate of interest which other banks paid, and would give a higher rate, with a minimum of 3 per cent. Then, for the employees who were steady and sober, and who remained at their work a considerable time (which was the case with most of them), they knew that the older hands were entitled to a certain sum of money annually over and above their wages. This would form the first nest-egg. When their savings reached (say) £10, they could invest it in the stock of the Company; and the officials would assist them in every way possible. He added that the scheme would be laid before the men for their consideration; and he hoped they would receive it favourably, as it was put forward for their benefit.

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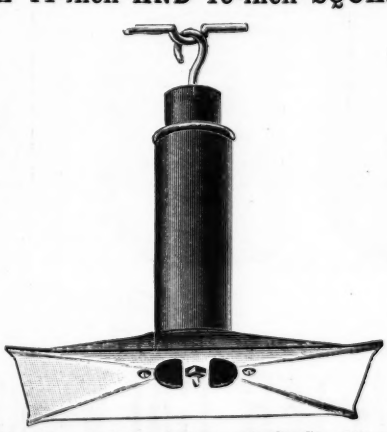

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Incandescent Gas Lighting for Theatres.—We learn from a copy of the "New Zealand Times" just to hand, that the Theatre Royal, Wellington, has lately been elaborately re-decorated and lighted by the incandescent gas system. The objection to having a chandelier, furnished with incandescent burners, under a lofty roof such as that of the theatre, has been the difficulty of re-lighting when perchance one of the "pilot lights" became extinguished after the jets had been lowered for stage effect. This difficulty, however, has been surmounted by an ingenious contrivance invented by Mr. C. B. Norwood. In the chandelier suspended over the auditorium are ten incandescent burners, and by the aid of a switch-light, which can be ignited at will from the stage, and one "pilot light," the remaining nine burners can be illuminated by a single automatic movement of the switch. At the main entrance are three lights of 210-candle power each. There are also 25 lights of 50-candle power each in the interior.

Gas v. Electricity at Salisbury.—At the last quarterly meeting of the Salisbury Town Council, the Town Clerk (Mr. W. C. Powning) read a letter from the Secretary of the Electric Lighting and Supply Company (Mr. A. R. Malden), asking permission to put up and maintain at their own expense, for three months, an experimental installation of arc electric lighting in Catherine Street, to allow the Council to judge of its suitability for adoption in the principal streets of the city. Mr. Harris said he believed there had been no complaint as to the present mode of lighting. The Surveyor said he had not heard any. Mr. Harris added that the town was as well lighted as any other of its size. Mr. Waters said he thought so long as the Gas Company showed the disposition that they had manifested to efficiently light the streets, it would be hardly generous on the part of the Council to entertain another mode of lighting, unless they had reason to complain of that which existed. It was resolved not to grant the permission asked for by the Electric Lighting Company.

Water Gas Manufacture at Pettau.—Particulars have been published as to the working of the water-gas plant, constructed on the Strache system, at Pettau, in the first half of the past year. For the supply of 168 consumers with 1179 burners, 66,795 cubic metres of gas were made, but 4404 cubic metres were utilized for a motor working a ventilating fan. The quantity used for lighting was consequently 62,391 cubic metres. There were 63,375 metric tons of coal of various kinds employed, the larger portion being lignite, mixed with 10·63 metric tons of coke, or 14·4 per cent. The production of 1 cubic metre (35·3 cubic feet) of gas required 0·94 kilogramme (2 lbs.) of lignite and 0·16 kilogramme (5⅝ oz.) of coke. The average cost of the coal per metric ton was 16·16 lire for the boilers and 18·8 lire for the generators; that of the coke, 35 lire. The total expenses for the half year (including the wages of the staff and the cost of repairs) were 4858 lire, or 7·77 centesimi per cubic metre of gas sold. It was estimated that for the half year there were 633 installations of the incandescent gas system, with 1029 private burners. The lighting extended over 388,000 hours, or 377 hours per burner. The life of the mantles was, on an average, 613 hours.

Driffield Gas-Works Extension.—The Driffield District Council yesterday week adopted a report received from the Gas Committee, recommending the erection of a new gasholder and other plant, at an estimated cost of £5400. It was decided that application be made for power to borrow a sum not exceeding £5600 for a period of 40 years.

A Loyal but Unenlightened District.—The district of the Kingswinford Rural Council has been unlighted by gas this winter, owing to the refusal of the Council to pay an increased price per lamp. As this has resulted in a saving of £800, a proposition has been made to utilize the money in erecting drinking fountains as memorials of the late Queen. It is stated that this cannot be done; and the money will therefore go to the relief of the next rate. The Council have made arrangements for electric lighting from Tipton when the station is ready to commence operations.

Checking Waste of Water in Salisbury.—The Inspector of Water Waste to the Salisbury Corporation recently presented to the Water Committee a report showing that on the 29th of January the total quantity of water supplied for all purposes was equal to 32 gallons per day per head of the population. The amount taken by the private meter consumption was 13½ gallons per head per day. The water for sewer flushing and all other purposes not supplied by meter would thus be 18½ gallons per head per day. The figures for the corresponding date last year were 37¾, 14½, and 23¼ gallons per head per day.

Rescue of Victims of Trolley-Wire Accidents.—The thoroughness with which the Liverpool Corporation are determined to prevent, if possible, a calamity such as the recent electric wire accident, with its fatal results, to which reference was made last week, is shown by the keen desire of all the Committees concerned to adopt such safeguards as may be reasonably supposed to meet the circumstances of like occurrences. Though the Tramways Committee are responsible for the proper equipment of their undertaking, the Watch Committee are bound to see that the highway is kept safe for those who may use it. Upon their suggestion, the Electrical Engineer (Mr. A. Bromley Holmes) submitted to their meeting on the 11th inst. proposals which, in his opinion, will at all events prevent some of the serious consequences which attended the recent accident. He recommends a provision of rubber gloves for the use of constables who may be required to rescue victims of a similar accident; and the Watch Committee have decided to ask the Tramways Committee to purchase ten dozen pairs of such gloves, two or three pairs of which are to be placed at each police or fire station. Mr. Holmes further states that if these gloves are not immediately available, a hooked stick or a folded newspaper may be used, provided both are not wet—in fact, almost anything dry which has no component part of steel may be usefully employed. An umbrella must not be used, because of the metal ribs. These and other suggestions of the Electrical Engineer are to be embodied in a general order, to be issued to the whole force by the Head Constable. It is considered probable that the Tramways Committee will furnish each car with rubber gloves, and also a pair of insulated nippers to cut "live" telephone or telegraph wires that may have fallen on the tramway wires.

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Opposition to the Stroud Gas Bill.—A meeting of owners and ratepayers in the Urban District of Stroud was held last Friday, for the purpose of consenting to the opposing of the Stroud Gas Bill. Mr. G. J. Holloway (Chairman of the Council) presided, and there was a large attendance. A letter was read from Mr. M. B. Marshall, J.P., strongly advocating opposition to the Bill, and quoting figures to prove that it would be a profitable investment for a public body in Stroud to have control of the lighting of the district. Messrs. W. D. Farrar and J. S. Powell stated that the traders of the district were in favour of opposition. Mr. E. F. Sargeant stated that what the ratepayers wished to see was that the Company gave the town gas of the illuminating power required under their Act. Mr. Trott said the Bill was bristling with objections from the ratepayers' point of view. He strongly advocated the establishment of a testing-station. Other speakers having addressed the meeting, a resolution consenting to the opposition by the Urban Council was carried unanimously.

Mr. W. M'Crae on the Dundee Gas Supply.—Last Thursday evening, Mr. W. M'Crae, Gas Engineer to the Dundee Corporation, delivered a lecture upon "Our Gas Supply," under the auspices of the Dundee Institute of Engineers. He began with a brief sketch of Murdoch's discovery of how coal gas could be manufactured, and proceeded to speak of how much the comfort, convenience, and well-being of the people depended upon the illuminant. He then, by the aid of diagrams and a model gas-works, described in detail the process of gas making. Speaking of the proper use of gas for illuminating purposes, he emphasized the necessity of attention being paid to the burners. Gas lighting, he said, had entered upon a new lease of existence with the introduction of the incandescent light, and they owed a deep debt of gratitude to Herr Welsbach for his great discovery. He also alluded to the high-pressure system of incandescent gas lighting, and dealt with the economical and convenient use of gas now available by penny-in-the-slot meters, cooking-stoves, &c. A cordial vote of thanks was passed to Mr. M'Crae.

Gas v. Electric Lighting at Ballymena.—The inhabitants of the town of Ballymena are at present exercised over the question of the lighting. The District Council have made overtures to the Gas Company to purchase their works; but the Company are not disposed to part with the business. The question of applying for compulsory powers of purchase has also been considered. Then the Council have consulted an electrical expert; but the best scheme he can suggest does not appear to be very promising. He estimates, under his plans, that if 3000 8-candle power lamps are connected, the income would amount to £1500, and the outlay for producing this would run to £1465, which leaves the magnificent profit of £35. Presumably this, if obtained, would be carried to the "relief of the rates," or, if accumulated during the present generation, it might be devoted to public improvements in the next. However, this is merely a suggestion. The ratepayers have been considering the matter at a public meeting; but they could not bring themselves to a pronouncement on the subject. Now, to guide the Council, a poll is to be taken on the question of whether the gas or the electricity proposals shall be followed up.

Omagh Gas Bill to be Opposed.—The result of the poll on the question of the Omagh District Council levying a rate to oppose the Bill of the Gas Company was made known last Wednesday, when the voting-papers were counted. The numbers were: For opposing, 513; against, 169—majority, 344.

Mond Bill Opposition.—For the protection of the interests of the inhabitants, the Sedgley District Council have resolved to oppose the Mond Gas Bill. The ratepayers and owners of property in West Bromwich have also sanctioned the proposal of the Corporation to oppose the Bill in order to obtain protective clauses, and not in a purely hostile spirit.

Carlisle Gas Workers and the Gas Committee.—The gas workers of Carlisle have asked for certain concessions; and the Gas Committee instructed the Engineer to interview the men, and see what they actually required. The men have decided to take no notice of any communication from the Engineer; and have referred him to their District Secretary (Mr. Lynas).

Shrewsbury Gas Bill.—The Shrewsbury Town Council have decided to oppose the Bill of the Gas Company if they cannot secure certain amendments and concessions. Limitation of interest on loan capital to 4 per cent., the application of the sliding-scale, and an alteration in regard to the powers of the Company to break open the streets appear to be the principal points upon which the Council desire to come to an agreement with the Company.

Galgate Water Supply.—The Parish Council of Galgate have lately had before them three schemes for providing the parish with a proper water supply. The Lancaster Corporation offered water by meter at the rate of 8d. per 1000 gallons, or a supply from their Blae Tarn reservoir at an estimated cost of £1169; while the Manchester Corporation offered it at 10d., but at 8d. for the present. It has been decided to recommend the District Council to accept the offer from Manchester.

Aldershot Gas and Water Bill to be Opposed.—At a special meeting of the Aldershot District Council on Monday last week, a Sub-Committee (consisting of Messrs. Calvert, Friend, Jeffries, and May) reported that, as the result of interviews with Parliamentary Agents and experts, they recommended the Council to lodge a petition against the Bill promoted by the Aldershot Gas and Water Company. The report was considered in private. At the close of the deliberations, the Council resolved, in open meeting, to empower the Committee to instruct Messrs. Bircham to proceed with the opposition.

Portable Photometer Tests of the South Metropolitan Company's Gas.—The Public Control Committee of the London County Council have reported the results of tests made at various Board Schools, with the portable photometer, of the illuminating power of the gas supplied by the South Metropolitan Gas Company for the eleven days ended the 5th inst. The average of all the tests is 14·9 candles, or 1·1 candle below the present statutory standard. The Committee have forwarded to the Company a copy of the return, and they are obtaining evidence to lay before the Metropolitan Gas Referees with the view to their prescribing additional testing-places in the county.

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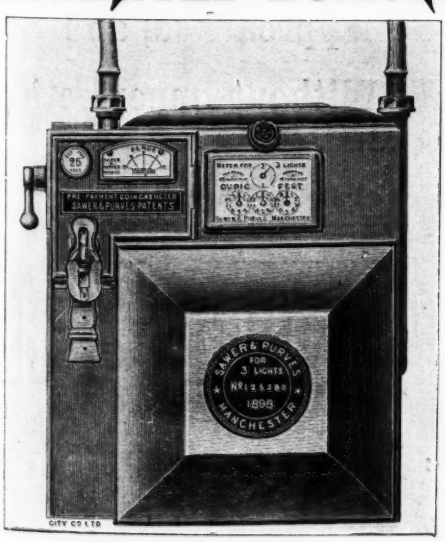
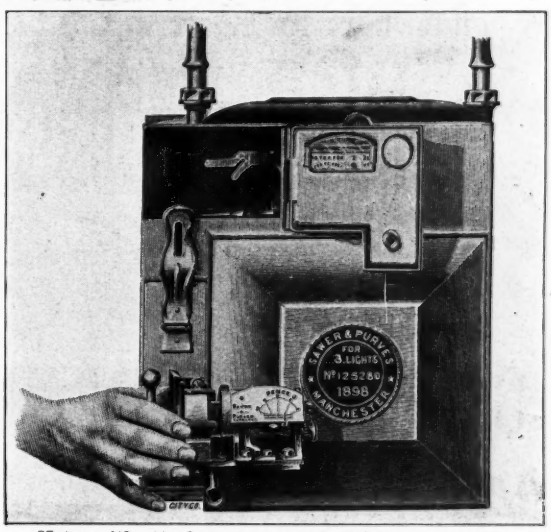


Meter in working position.



Meter with attachment removed without uncoupling.

Broadstairs and the Water-Works.—The Broadstairs Water Company have approved a provisional agreement authorizing the sale of their undertaking to the District Council for £42,800.

Colwyn Bay and the Gas-Works.—The Colwyn Bay Town Council are promoting in the present session of Parliament a Bill to enable them to acquire the local gas undertaking. By a large majority, a recent meeting of ratepayers repudiated the Council's action; and a poll was demanded. The result was declared last Friday. Taking the voters individually, there was a majority of 108 against the purchase; but under the cumulative system, the Council gained a majority of 99. The opposition claim a moral victory, and threaten to frustrate the scheme.

Ilkeston and Heanor Water Scheme.—In compliance with Standing Orders, estimates have been prepared on behalf of the proposed Ilkeston and Heanor Water Board, showing the cost of the works proposed to be undertaken by them. They comprise the sinking of an intercepting well, communicating with the Meerbrook Sough, from which well an aqueduct will be made to a pumping-station, whence another aqueduct will be built to a covered service reservoir, to be called the Chadwick Nick reservoir. Two other aqueducts will also be laid down, in connection with the proposed covered service reservoirs at Shipley and Codnor Park, to be known respectively as the Ilkeston and Codnor reservoirs. The aggregate cost of these works is estimated at £128,000, which includes the purchase of the necessary property, and provides for contingencies. The further sum of £6000 will, however, have to be found by the Corporation of Ilkeston and the Urban District Council of Heanor, to acquire the undertaking of the Meerbrook Sough Company.

Serious Gas Explosions.—Four large offices at No. 15, Victoria Street, Westminster, the rooms of the Victoria Government, were completely wrecked by an explosion between eight and nine o'clock on Monday morning last week. A cleaner, named Elizabeth Mooney, went into the offices, accompanied by a lad. When she opened the door, there was a violent explosion, which shattered the furniture, blew out the windows, and did other damage. All the back windows on the different floors of the building were blown out. The woman and boy were both injured, and were treated at the Westminster Hospital. The Fire Brigade officials, who made inquiries, thought that from a large chandelier gas must have been escaping since the previous Saturday, and that when Mrs. Mooney opened the door, the accumulated gas was blown on to the flash-jet of an incandescent light and ignited. On the same morning, a gas explosion of a dangerous nature, but fortunately unattended with serious consequences, took place in Nottingham at the junction of two streets where there is a manhole in connection with the sewage mains. The iron plates and circular lid covering this hole were observed to shoot into the air; and simultaneously there was a loud explosion. Fortunately nobody was in the immediate vicinity at the time. Large numbers of men were engaged in excavation work near the spot. It is supposed that the gas had been escaping at some point, and had gradually accumulated in the manhole.

York Town Gas-Works Sold to the Aldershot Gas Company.—A special meeting of the York Town and Blackwater Gas Company was held at the offices on the 8th inst., to discuss a resolution empowering the Company to sell the undertaking to the Aldershot Gas and Water Company. The preamble and marginal notes of the Aldershot Company's Bill were read by the Secretary (Mr. Rowe), who also read the agreement made between the two Companies, and approved by their Directors. The Chairman (Mr. Alfred H. Claypole) then made a statement as to the negotiations which had taken place between the parties from their commencement in June, 1900, to the present time. From these it appeared that the Aldershot Company, in June last, put forward a claim to exercise lighting powers in the district assigned to the York Town Company by their Provisional Order of 1890. This Company declining to recognize that claim, efforts were made to effect an arrangement with the object of averting, if possible, a contest in Parliament. Various suggestions were put forward by both of the Companies; and eventually the Aldershot Company offered to purchase the other Company's undertaking for £11,000. The York Town Company not being able to agree to this, they named their own price—£17,300. Ultimately both Companies agreed to refer the question to Mr. Corbet Woodall, who recommended them to come to terms on a basis of £17,000. The Directors of both Companies agreed to this, and a resolution embodying the decision was passed. A number of questions having been answered by the Chairman, a resolution sanctioning the sale was passed, with three dissentients.

Suffocation by Gas at Brighton.—Mr. Vere Benson opened last Thursday an inquiry into the circumstances attending the death of Mrs. Emma Lintott, which took place at 10, Connaught Road, Hove, on the previous Sunday night or Monday morning. Deceased and her husband retired to rest on the night of the 9th inst., and it appeared from the evidence that both were overpowered by an escape of gas. The husband recovered sufficiently to rise on Monday morning with some difficulty, and leaving his wife, as he thought, asleep. On returning to her, however, he found her in an insensible condition; and he summoned medical aid. The lady had been subject to fainting fits due to a weak heart; and when the doctor arrived she was dead. He deposed that death was due to suffocation attributable to slow poisoning by gas. Mr. A. S. Cooke, the Chief Inspector of the Brighton and Hove Gas Company, said he examined the premises, and found gas escaping from the main tap in the hall at about the rate of consumption by an ordinary burner. The gas-fitter who put in the fittings said the damaged tap appeared to be sound when he fixed it last October. Mr. Joseph Cash, the Company's Engineer, advanced the theory, as accounting for the leak, that there was a small latent crack in the tap, which was opened by the contraction of the pipe leading to the meter in consequence of the cold weather. Several of the Jury assented to this theory. Mr. Cash examined the tap, and stated that, in his opinion, it was too light, while the thread had been cut too deep. He pointed out some fractures, and intimated that this implied that it must have sustained a very severe pull or strain. The Coroner having summed up, the Jury returned a verdict of "Accidental death."

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Margate Water.—The long-debated question as to whether the Margate Corporation should expend £150,000 in an effort to procure a water supply from the Village of Wingham has been settled by the rejection of the scheme by the ratepayers. A poll resulted in the following voting: For the Bill, 1443; against, 1807; majority against, 364.

Gas for the Public Lighting of Woking.—In a paragraph which appeared in the "JOURNAL" for the 29th ult., some information was given as to the competing tenders of the Gas and Electric Lighting Companies for the public lighting. The matter has since been discussed all round by the Council; and by eight votes to five they, last Wednesday, resolved to adopt incandescent gas lighting.

Artesian Boring at Hampstead.—An artesian well has been sunk by the Hampstead Borough Council at their Electric Lighting Works, Lithos Road. This has been done, partly to save, if possible, the cost of the water obtained from the West Middlesex Water-Works Company, amounting to over £500 a year, and partly to prevent any danger from a breakdown or stoppage of the water supply. At a cost of £600 the well has been sunk 500 feet, and a yield of 600 gallons of water per hour obtained. It has been decided to proceed for another 100 feet, at a cost of a further £160, in the hope that a yield of 4000 gallons an hour can be obtained.

Water for Fire Extinction.—The Bradford Water-Works Engineer (Mr. James Watson) has presented a long report to the Water Committee of the Corporation upon the recent decision in the action brought by the Corporation against Messrs. Rouse and Co., with reference to the cost of water used in the extinction of fires (*ante*, p. 342). Mr. Watson expresses the opinion that, as the provision of inside fire appliances reduces the insurance premiums, firms using such appliances should be required to relinquish them, unless they are prepared to give an undertaking to pay for all water passing through their meters, whether employed for ordinary trade purposes, waste, or fire extinction.

The Lighting of Montreal.—The largest Trust ever formed in Canada, says the Montreal correspondent of the "Morning Post," is now in process of organization in that city. It is known as the Lighting and Power Company of Montreal, and it will include all the Companies now supplying the city with illumination and power. These will include the Royal Electric Company, the Lachine Rapids Hydraulic and Land Company, the Chambly Manufacturing Company, and the Montreal Gas Company. The capital is put at £5,000,000. The Montreal Legislature will be asked to change the Act of Incorporation of the different Companies so that all the newly-acquired shares of the stock can be voted on at the next annual meeting. One who has a big interest in the new combine announced lately that while there would be no immediate advance in the price of gas, the Corporation would be compelled to raise the present charge for electric lighting and power. He said electricity was being supplied at Montreal at a loss, because of the strong competition among the different companies. The correspondent referred to says there is much opposition to the combination on the part of consumers, and a powerful lobby will be sent to the Provincial Legislature to try to block the scheme. The Directors, however, profess to have no fear of failure in their enterprise.

Dover Water Supply.—We learn from the "Thanet Times" that at the last meeting of the Dover Town Council the Surveyor reported that the quantity of water furnished for all purposes was 422⅛ million gallons; 99½ million gallons being supplied by meter, and the remainder for domestic supply, street watering, flushing, gardens, &c. He called particular attention to the great increase in the supply through meters. In 1894 the total was 321¾ million gallons, of which 31 million gallons was by meter. In 1899 the total supply was 434 million gallons; by meter 88⅛ million gallons. The total supply per head in 1900 was 28·92 gallons. For trade purposes 6·82 gallons per head was used, which left a supply for domestic use, street watering, &c., of 22·1 gallons per head. The income derived from the sale of water by meter was, in 1894, £775; in 1899, £2211; and in 1900, £2489. A comparison of the total supplies in 1899 and 1900 showed that 11⅜ million gallons less water was supplied in 1900, though the meters showed an increase of 11 million gallons over the previous year. So that, apart from the increased meterage, the supply was 22¾ million gallons lower than in 1899, although a larger population was supplied. On the basis of the rate charged for water (£25 per million gallons), the saving amounted to £579. The Surveyor further informed the Council that in 1894 the total consumption of water per head was 27·55 gallons.

It is reported in commercial circles that the Staveley Iron-Works Company have secured the contract for the cast-iron pipes required in connection with the Derwent Valley water scheme.

The Accrington Gas and Water Board have placed a repeat order with Messrs. R. Dempster and Sons, Limited, of Elland, for eight settings of eight retorts, on Chester's regenerator system, for the Great Harwood Gas-Works.

The Cardiff Gas Company have given the Corporation notice to terminate their agreement for street lighting on the present terms. The price the Company seek to charge means, it is stated, an extra cost to the town of £1284 per annum.

The fees of the Battersea Borough Council in connection with the recent inquiry before the Railway and Canal Commissioners in regard to the quality of the water supplied by the Southwark and Vauxhall and Lambeth Water Companies amounted to £504 13s.

The Directors of the Gas, Water, and General Investment Trust, Limited, recommend dividends at the rate of 4½ per cent. per annum on the preferred stock and 4 per cent. per annum on the deferred stock for the half year ended the 28th ult., carrying forward about £7500.

The South Staffordshire Mond Gas Company, Limited, has been registered with a capital of £10,000, in £50 shares, to manufacture, supply, sell, and distribute the product known as "Mond Gas," or any other gas for motive power, heat, or other purpose, in certain districts in Stafford and Worcester; also to manufacture and deal in coke, sulphate of ammonia, and other residual products of coal or gas.

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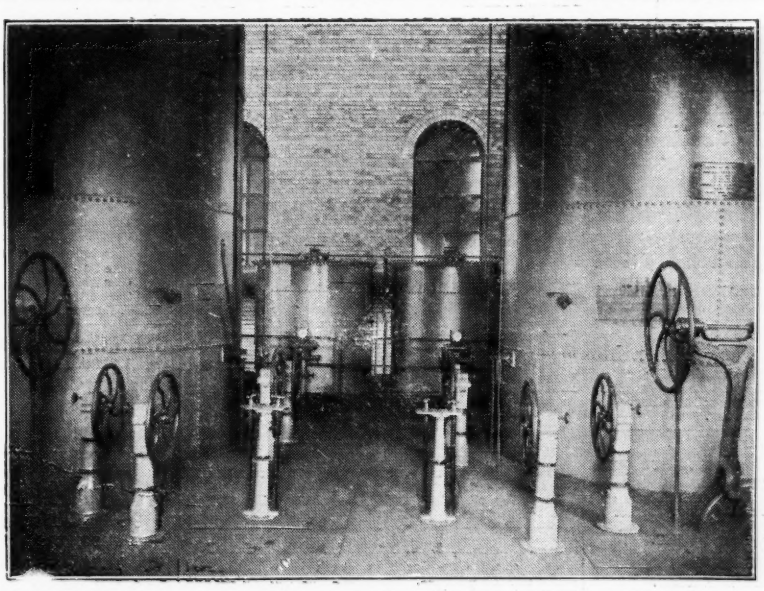

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The Town Clerk of Warrington (Mr. J. Lyon Whittle) has received a writ from a Manchester Solicitor on behalf of Mr. John Pemberton, builder, of Stockton Heath, in which that gentleman demands permission to examine the manuscript minutes and accounts of the Corporation Gas Committee.

The Nelson Corporation have placed an order with Messrs. R. Dempster and Sons, Limited, of Elland, for four purifiers (recently advertised for), 30 feet long, 20 feet wide, and 6 feet deep, complete with superstructure, staging, roof, hoist, &c.; the work to be completed during the coming summer.

The "Financial News" says the Swedish coal contract which regulates the year's contract prices has been adjudicated. Of the 333,000 tons asked for, orders for 76,000 tons went to Scotland; the North of England receiving the bulk. The successful tenders were no less than 6s. 6d. to 9s. per ton under last year.

An undertaking with the somewhat vague title of the Water-Works Company, Limited, has been registered with a capital of £4050, in £1 shares, to carry on the business of concessionnaires, contractors, financiers, bankers, manufacturers, merchants, agents, trustees, executors, contractors for public works and conveniences, engineers, &c.

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WANTED, a Clerk of Works to superin- tend the construction of Masonry Reservoir and the laying of Mains and Service-Pipes. Applicants to state Age, Experience, and Salary required, and to forward *copies* of not more than three recent Testimonials.
Apply, by letter, to No. 3648, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Working Manager for a small Gas-Works in South Wales. Annual make about 5 millions. Must be a good Carbonizer and practical Mechanic. Able also to read Meters, and prepare and collect Consumers' Accounts. Wages 30s. per week, with House and Gas.
Apply, in own handwriting, with recent Testimonials, to No. 3645, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

OXIDE OF IRON OF FINEST QUALITY.
BALE'S Special Fire Cement should be used to keep Retorts, Furnaces, &c., in good repair during the heavy Winter Work.
Send for full Particulars to
BALE & Co., 120 & 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."
Telephone "277 HOLBORN."

SULPHATE OF AMMONIA SATURATORS.
JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c., CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special attention to Repairs.
Before placing Orders, please write for Estimate.
Telegraphic Address: "SATURATORS, BOLTON."

WANTED, Offers for Four Purifiers, 12 feet square, 4 ft. 6 in. deep, with 10-inch Connections, Donkin Valves, Lifting Apparatus, &c., as fixed.
Can be seen in use by appointment, near London.
Address No. 3639, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

A SET of Four Second-Hand Purifiers wanted, with an area of not less than 190 feet each.
Offers, with full Particulars, to be sent in the first instance to No. 3603, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ONE Exhauster and Engine complete and One EXHAUSTER only (12,000 cubic feet per hour each) FOR SALE at the Gas-Works, St. Mary Cray, Kent.
Apply to W. B. MIMMACK, Manager and Secretary.

FOR SALE, cheap - One, Two, or Three PURIFIERS, 8 ft. square by 4 ft. deep, in good condition, with Valves, Connections, and Lifting Gear.
INQUIRIES for all kinds of SECOND-HAND GAS PLANT will also be esteemed by SAML. WHILE AND SON, 60, Queen Victoria Street, LONDON, E.C.

GAS GOVERNORS for Sale:—
Two 1¼-inch STOTT GOVERNORS.
Four 1-inch " "
Three ¾-inch " "
One ¾-inch " "
One 12-horse power BRADBEAR GOVERNOR.
One 8-horse power " "
One 6-horse power " "
T. M. DAFFERN, 20, High Street, COVENTRY.

GAS-METERS for Sale:—
Three 3-light METERS.
Two 10-light "
Two 30-light "
Three 5-light "
Three 20-light "
One 50-light "
Also the following SECOND-HAND METERS
One 300-light METER.
One 10-light "
Two 5-light "
T. M. DAFFERN, 20, High Street, COVENTRY.

THE Corporation of Liverpool have for DISPOSAL a large number of modern 14-inch square Lamps, Copper built throughout, with plain Glass sides, and Opal Glass top, for use in Cradles or on Legs. They are in good repair; a large number of them being practically equal to new.
A sample will be sent on application. Price 7s. 6d. each at the Stores, Hood Street.
C. R. BELLAMY,
City Lighting Engineer.
Hood Street, Liverpool.

TO BE LET on Hire—
PULSOMETER, Size No. 5, with 4-in. suction and 3-in. delivery. Steam-Pipe 2½ in. diameter. Discharge 10,000 Gallons per hour.

TO BE SOLD—
EXHAUSTER for 63,000 feet per hour, with Steam-Engine, by Gwynne. In excellent condition. Replaced by 200,000 feet.
Write J. WRIGHT, Bridge House, BLACKFRIARS BRIDGE, E.C.

50 GAS SHARES for Sale, always paid Maximum Dividend of 7 per cent. Best offers. Full Information obtainable.
Apply to A. C. FAWCETT, Gas Office, Blyth, NORTHUMBERLAND.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY Gas Engineer, Thornhill, DEWSBURY.

WANDSWORTH AND PUTNEY GASLIGHT AND COKE COMPANY.

THE Directors of the above Company will shortly be putting out of action, and have FOR DISPOSAL, Two 20,000 cubic feet per hour CIRCULAR STATION METERS, fitted with 12-inch Connections and Valves, and for which they invite offers.

Both Meters, within the last few years, have been supplied with New Drums, by Messrs. W. & B. Cowan, Limited.

The Meters may be seen in action at these Works on application by appointment to the undersigned, who will also be happy to furnish any further Particulars.

H. H. JONES,
Engineer and Manager.
Gas-Works, North Street,
Wandsworth, S.W., Feb. 15, 1901.

TIPTON URBAN DISTRICT COUNCIL.

THE Gas Committee of the above Council invite SCHEMES and TENDERS for a COKE CONVEYING PLANT, to be erected at their Gas-Works.

Particulars may be obtained from the Engineer, Mr. H. O. Timmins, Gas-Works, Tipton, Staffs.

Tenders will be received not later than Thursday, the 28th. inst., by

JNO. W. WARING,
Secretary.
Gas Offices, Tipton,
Feb. 4, 1901.

DARWEN CORPORATION.
(GAS DEPARTMENT.)

TENDERS FOR FIRE-CLAY, RETORTS, BRICKS, &c.

THE above Corporation are prepared to receive TENDERS for the supply for One Year of FIRE-CLAY, RETORTS, BRICKS, &c.

Forms of Tender and all Information as to Quantities may be obtained on application to Mr. A. H. Smith, Gas Engineer, Darwen.

Sealed Tenders, endorsed "Fire-Clay Goods," must be delivered to the undersigned at or before noon, Saturday, the 23rd day of February, 1901.

By order,
WILLIAM P. HALLIWELL,
Town Clerk.
Town Clerk's Office,
Darwen, Feb. 5, 1901.

FIRE-BRICKS, &c.

THE Gas and Electricity Committee of the Stafford Corporation, invite TENDERS for the supply of FIRE-CLAY GOODS over a period of Twelve (12) Months.

Forms of Tender and other Particulars may be obtained, upon application, from Mr. Hubert Pooley, Gas Engineer, Stafford.

Tenders, to be endorsed "Retorts," and to be addressed to the Chairman of the Gas Committee, Gas Offices, Chell Road, Stafford.

Sealed Offers must be received not later than Friday, Feb. 22, 1901.

The Committee do not bind themselves to accept the lowest or any Tender.

(Signed) HUBERT POOLEY, A.M.Inst.C.E.,
Gas Engineer.
Gas Offices, Chell Road,
Stafford, Feb. 11, 1901.

BOROUGH OF BARROW-IN-FURNESS.

THE Corporation are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Gas-Works from the 1st day of April next to the 31st day of March, 1902, delivered into the Purchaser's Tank-Waggons at the Gas-Works Siding.

Any further Information may be had on application to the Manager of the Gas-Works.

Sealed Tenders, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Tar," to be delivered at the Town Clerk's Office on or before Tuesday, the 26th inst.

The highest or any Tender not necessarily accepted.

By order,
C. F. PRESTON,
Town Clerk.
Town Hall, Barrow-in-Furness,
Feb. 7, 1901.

BOROUGH OF BARROW-IN-FURNESS.

THE Corporation are prepared to receive TENDERS for the supply of machine-moulded FIRE-CLAY RETORTS, FIRE-BRICKS, CAST-IRON PIPES, WROUGHT-IRON TUBES and FITTINGS, BRASS COCKS, GAS-METERS, and SULPHURIC ACID as may be required from the 1st day of April next to the 31st day of March, 1902.

Sealed Tenders, on Forms to be obtained at the Office of the Manager of the Gas and Water Works, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Stores," to be delivered at the Town Clerk's Office on or before Tuesday, the 26th inst.

The lowest or any Tender not necessarily accepted.

By order,
C. F. PRESTON,
Town Clerk.
Town Hall, Barrow-in-Furness,
Feb. 7, 1901.

BICESTER GAS-WORKS.

THE Directors of the Bicester Gas, Coke, and Coal Company invite TENDERS for taking the WORKS ON LEASE for the term of Seven Years from the 25th day of March, 1901.

Applicants are requested to apply to me at my Office in Bicester, Oxon, for the Terms of Letting; and sealed Tenders, subject to such Terms, are to be delivered to me on or before the 25th day of February, 1901.

The Directors do not pledge themselves to accept the highest or any Tender.

By order,
GORDEN WALSH,
Secretary.
Bicester, Oxon,
Jan. 28, 1901.

YOUGHAL URBAN DISTRICT COUNCIL.

THE Council are prepared to receive TENDERS for the supply and erection of a TWO-LIFT TELESCOPIC GASHOLDER for an existing Tank, 41 ft. 6 in. diameter by 13 ft. 6 in. deep.

Plans and Specification and all Particulars may be obtained on application to the Council's Engineer, Mr. R. B. Anderson, 35A, Great George Street, London, on payment of One Guinea, or Tenderers may submit their own Designs.

Tenders, endorsed "Gasholder," to reach the undersigned by the 20th inst.

The Council do not bind themselves to accept the lowest or any Tender.

JAMES J. O'SHEA,
Clerk to the Council.
Town Hall, Youghal.

SOWERBY BRIDGE URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE above Council are prepared to re- ceive TENDERS for the supply of the following: RETORTS, FIRE-BRICKS, FIRE-CLAY, &c.; SETTING RETORTS per Bench; LINING FURNACES per Furnace; SULPHURIC ACID; SPECIAL CASTINGS—required for the ensuing Twelve Months.

Also TENDERS for OLD SCRAP IRON, OLD CAST IRON, OLD BRASS, &c.

Specifications and Forms of Tender can be obtained by applying to Mr. John Marsland, Engineer and Manager, Gas-Works, Sowerby Bridge.

The Council do not bind themselves to accept the lowest or any Tender.

Tenders to be sent in not later than Noon on the 25th of February inst., endorsed "Tender for Retorts" (or other Material as the case may be), and addressed to

R. W. EVANS,
Clerk to the Council.
Commercial Bank Chambers,
Halifax, Feb. 13, 1901.

BRIGHTON AND HOVE GENERAL GAS COMPANY.

TO THE PROPRIETORS.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of the Company will be held at the Company's Offices, No. 5, Great Winchester Street, London, on Friday, the 8th of March, 1901, at Two o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 31st of December, 1900, to declare Dividends, to elect Directors, to appoint a Special Auditor, and for other purposes.

The TRANSFER BOOKS of the Company WILL BE CLOSED from the 23rd of February to the 8th of March, both days inclusive.

By order,
ERNEST L. BURTON,
Secretary.
5, Great Winchester Street,
London, E.C., Feb. 15, 1901.

HORNSEY GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Offices of the Company, No. 63, Chancery Lane, in the County of Middlesex, on Friday, the 1st day of March, 1901, at Half-past Three o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 31st of December last, to declare Dividends, elect two Directors and an Auditor, and to transact the Business of an Ordinary General Meeting.

The TRANSFER BOOKS WILL BE CLOSED from the 15th of February to the 1st of March, both days inclusive.

By order of the Board,
WILLIAM E. ROBERTS,
Secretary.
Offices: 63, Chancery Lane,
London, W.C., Feb. 12, 1901.

OTTOMAN GAS COMPANY, LIMITED.

NOTICE is Hereby Given, that the ORDINARY GENERAL MEETING of the Shareholders of this Company will be held at the Offices of the Company, 9, Queen Street Place, Cannon Street, E.C., on Tuesday, the 26th day of February, 1901, at One o'clock in the Afternoon precisely, to receive the Report of the Directors and Statement of Accounts for the Half Year ended the 31st of December last, to declare a Dividend for the same period, to elect two Directors and one Auditor in place of those retiring by rotation, and one Auditor in the place of Mr. Charles K. Butt, who has resigned by reason of ill-health, and to transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 19th day of February until after the Meeting.

By order of the Board,
THOMAS GUYATT,
Secretary.
9, Queen Street Place, Cannon Street,
London, E.C., Feb. 12, 1901.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held PERIODICALLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by AUCTION of GAS and WATER STOCKS and SHARES under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

SUNDERLAND AND SOUTH SHIELDS WATER COMPANY.

IMPORTANT SALE
OF
WATER STOCK.

TO BE SOLD by Auction in the Long Room of the Queen's Hotel, Fawcett Street, Sunderland, on Thursday, the 21st of February, 1901, at Two o'clock in the Afternoon prompt,

MR. ATKINSON GIBSON, AUCTIONEER,

£15,000

(Nominal) of the NEW STOCK (Maximum Dividend 5 per cent.) authorized to be created and issued under the powers contained in the Sunderland and South Shields Water Act, 1891.

The above Stock will be entitled to Dividend from the 1st day of January, 1901, and be registered in the name of the Purchaser free of charge.

A Deposit of 10 per cent. will be required at the time of Sale; the remainder to be paid on or before the 1st day of March, 1901.

Now Ready, Fcap. Fo'., 28 pp., 2 Plates, and 43 Illustrations, Bound in Duplex Paper Cover, Price 2s. 6d. net, post free.

A DESCRIPTION OF THE ZURICH NEW GAS-WORKS.

By A. WEISS, Engineer of the Works.

Translated from the German for, and Reprinted from the "JOURNAL OF GAS LIGHTING," &c.

LONDON:
WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

Net Price: Cloth Bound, 12s. 6d.; Morocco Gilt, 18s.

GAS COMPANIES' BOOK-KEEPING.

A Practical Treatise on the Keeping of Gas Companies' Accounts.

By

JOHN HENRY BREARLEY & BENJAMIN TAYLOR,
OF LONGWOOD.

This Book has been very favourably reviewed in the Press; the following being examples of the notices:—

Unlike most of the recent works on book-keeping, this volume is a valuable addition to the literature of the subject. Of text-books on book-keeping in general we have more than sufficient; but we heartily welcome the appearance of such books as this which deal exhaustively with the accounts of some particular industry. The authors deal with the subject in an exceedingly practical way, giving not only specimens of the books and forms required, but also a model set of transactions which should enable the student to obtain a thorough insight into the subject.—*The Accountant's Magazine.*

It is the fruit of 33 years of practical and professional experience. It is very painstaking and complete. A large portion of the matter is adaptable to the book-keeping of Local Authorities. A thoroughly practical and excellent work.—*Glasgow Herald.*

For financial intricacy, the keeping of Gas Companies' accounts is hard to equal, and the publication of "Gas Companies' Book-keeping" is timely. This treatise deals in the most exhaustive manner with the keeping of gas accounts.—*Daily Mail.*

There can be no doubt of the practical usefulness of this work to everyone concerned in the keeping of gas accounts. It is well printed on excellent paper, and neatly bound in cloth.—*Huddersfield Examiner.*

The subject is comprehensibly dealt with.—*Morning Post.*

LONDON:
WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

HEBBURN MAIN GAS COALS.

Yield of Gas per Ton . . 10,500 Cubic Feet.
Illuminating Power . . . 16·4 Candles.
Coke . . . . . 68 per Cent.

For Prices, f.o.b. Ship or Delivered by Rail, apply to

The Wallsend & Hebburn Coal Company, Ltd.
8 Lombard Street,
NEWCASTLE-ON-TYNE.
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CRESSWELLS' ASBESTOS CO., LTD.
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Asbestos Spinners and Manufacturers.
Telephone No. 950. Tels.: "ASBESTOS, BRADFORD."

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It is cheaper in First Cost, and better than Imitations. Ask for No. 1 Catalogue.
Applications for Colonial and Foreign Agencies desired.

JAMES OAKES & CO.
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,
Manufacture and keep in Stock at their Works (also large stock in London)
PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts and Covers, and rendering Leakage impossible.

THE SILICA FIRE-BRICK COMPANY,
OUGHTIBRIDGE, near SHEFFIELD,
MANUFACTURE
SILICA BLOCKS, BRICKS, AND CEMENT
OF SUPERIOR QUALITY
FOR GAS-FURNACES.
Trade Mark: "SILICA."
These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their
GREATER DURABILITY,
Strongly recommended where EXCESSIVE HEATS have to be maintained.

HOLMSIDE GAS COALS.
Present Daily Produce over 5000 Tons.
Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation

Yield of Gas per Ton	11,205 Cubic Feet.
Illuminating Power	16 1/10 Stand. Sperm Candl.
Coke (of good & pure quality)	13¾ Cwt. per Ton.
Sulphur	A little over 1 per Cent.
Ash	Under 1 per Cent.
Tar	163 lbs. (Avoir.) per Ton.
Ammoniacal Liquor	103 lbs. (Avoir.) per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.
Present Daily Produce available 3000 Tons.
Of equal quality to the "Holmside" Coal, and also very largely used by many Gas Companies at Home and Abroad.
Both descriptions are shipped at Tyne Docks, and Dunston Staiths, River Tyne, also at North and South Docks, Sunderland.
These Coals may be bought through the Principal Merchants in England, or direct from
MR. MARK ARCHER,
HOLMSIDE & SOUTH MOOR OFFICES, NEWCASTLE-UPON-TYNE.

HYDRAULIC BLOWER
For blowing Air into Gas Purifiers for the purpose of
REVIVIFYING THE FOULED OXIDE.
Full Particulars on application.
LUXWERKE LUDWIGSHAFEN AM RHEIN.

BOLDON GAS COALS.

Yield of Gas per Ton	10,500 Cubic Feet.
Illuminating Power	16·9 Candles.
Coke	66·7 Coke.
Sulphur	0·86 Sulphur.
Ash	2·04 Ash.

As per Analysis by
Mr. JOHN PATTINSON, F.I.C., F.C.S.
For Prices, &c., apply to
W. H. PARKINSON,
THE HARTON COAL CO., LTD.,
NEWCASTLE-ON-TYNE.
Telegraphic Address: "PARKINSON, NEWCASTLE."

GAS-FITTINGS. **INCANDESCENT**
BURNERS
Welsbach Pattern
per 7/6 Doz.
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NEWBATTLE CANNEL.
Highest Results in Gas, & Excellent Coke.
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LIMITED,
NEWBATTLE COLLIERIES,
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SULPHURIC ACID.
GUARANTEED absolutely free from Arsenic and of excellent Purity. Specially prepared for Sulphate of Ammonia Manufacturers.
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Best Gas Coal and Cannel, giving High Illuminating Power, Large Yield per ton, and reasonable in Price.
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Rich in **Illuminating Power and Yield of Gas.**
Above **the Average in Weight and Quality of Coke.**
Maintains **a High Standard in Residuals.**
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THOMAS TURTON AND SONS, LIMITED,
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MANUFACTURERS OF
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Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·83 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	17·8 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	73·1 per cent.

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COAL OWNERS, NEWCASTLE-ON-TYNE;
OR
E. FOSTER & CO.,
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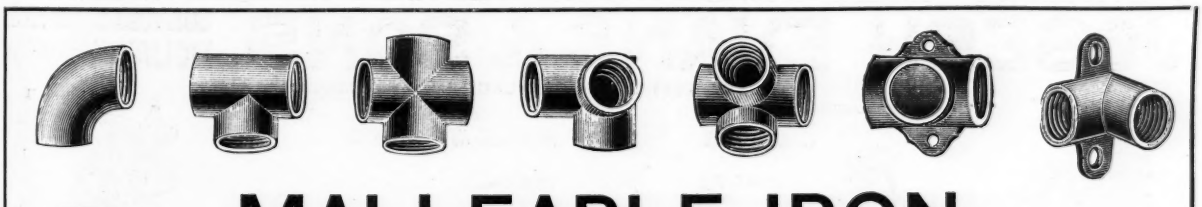

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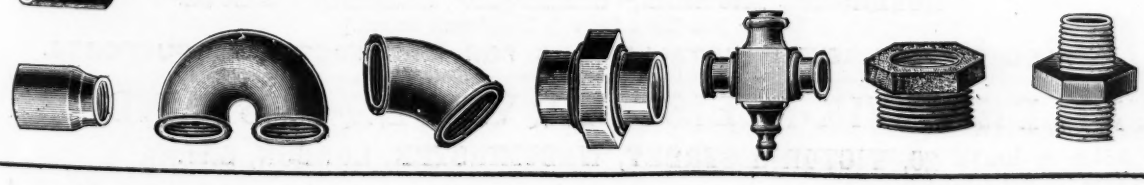

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Analysis made by
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Yield of Gas per Ton . .	10,500 Cub. Ft.
Illuminating Power . . .	16·9 Candles.
Coke (of good quality) . .	67·5 per Cent.
Sulphur	0·58 „
Ash	2·73 „

For Price, &c., apply to the
WEARDALE IRON & COAL Co., Ld.
QUAYSIDE, NEWCASTLE-ON-TYNE.

NITRATE of Thorium and Cerium.
FABRIK CHEMISCHER PRAEPARATE VON STHAMER, NOACK, AND Co., HAMBURG.

DISPENSE WITH CANNEL COAL
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INCREASE YOUR ILLUMINATING POWER
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WHESSOE-MUNICH BENZOL CARBURETTER
The Cheapest and Best in the Market.
The Managers of Tynemouth, Middlesbrough, and Darlington Gas-Works are much pleased with it, and would not be without it.
Apply to the Sole Makers:
THE WHESSOE FOUNDRY COMPANY, LIMITED,
DARLINGTON.

UNEQUALLED.
Gas Companies are solicited to try Samples of the
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BLACK BED GAS COAL.
Prices and Analysis on application.
MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

COKE-BREAKERS,
PRICES REDUCED.
(THOMAS & SOMERVILLE'S PATENT)
With Elevators and Conveyors worked by Steam or Gas Engine.
GEORGE WALLER & CO.,
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FOR
GAS PURIFICATION,
For use in the
RECOVERY OF SULPHUR,
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Removal of last Traces of SULPHURETTED HYDROGEN in catch position.
Full Particulars on application to the Patentees
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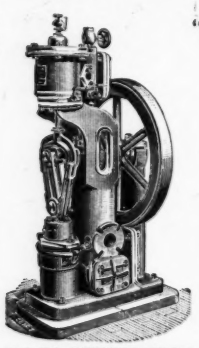

Fig. 703. "SINGLE RAM" STEAM-PUMP.

12,000 PUMPS IN STOCK AND PROGRESS.
TRADE MARK.
NO TAPPETS.

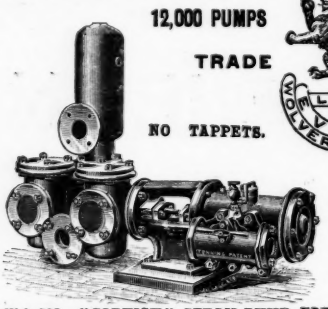

Fig. 893. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

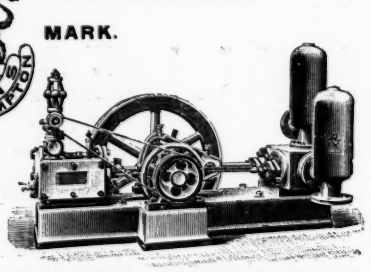

Fig. 688. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

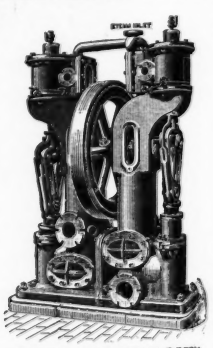

Fig. 713. "DOUBLE-RAM" STEAM-PUMP.

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[* Blue Water Gas with Incandescent Burners.]
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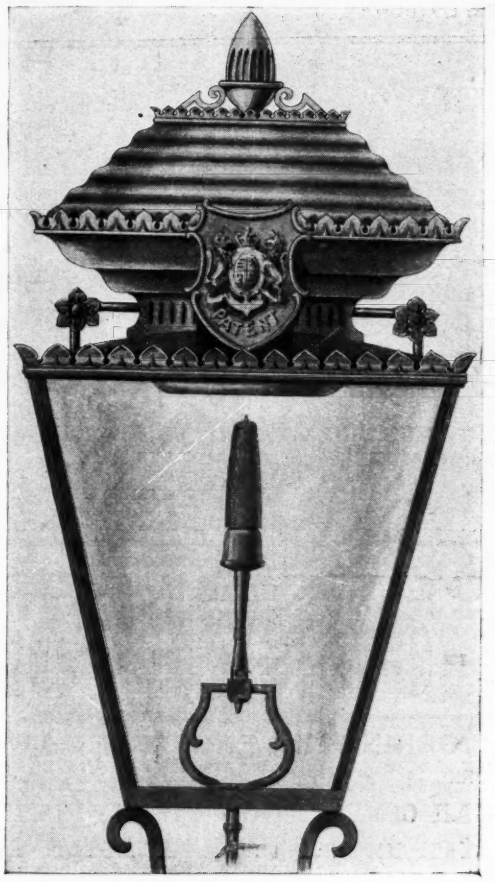

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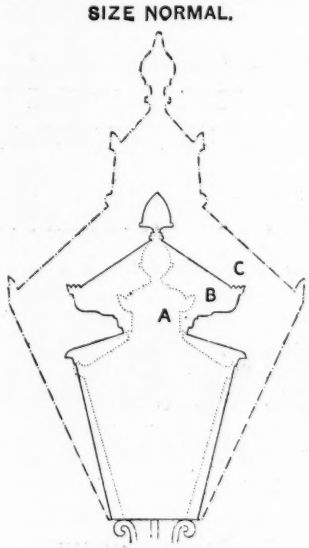

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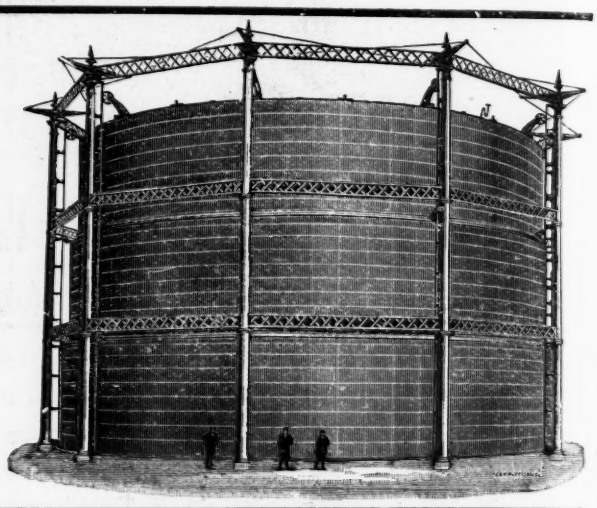

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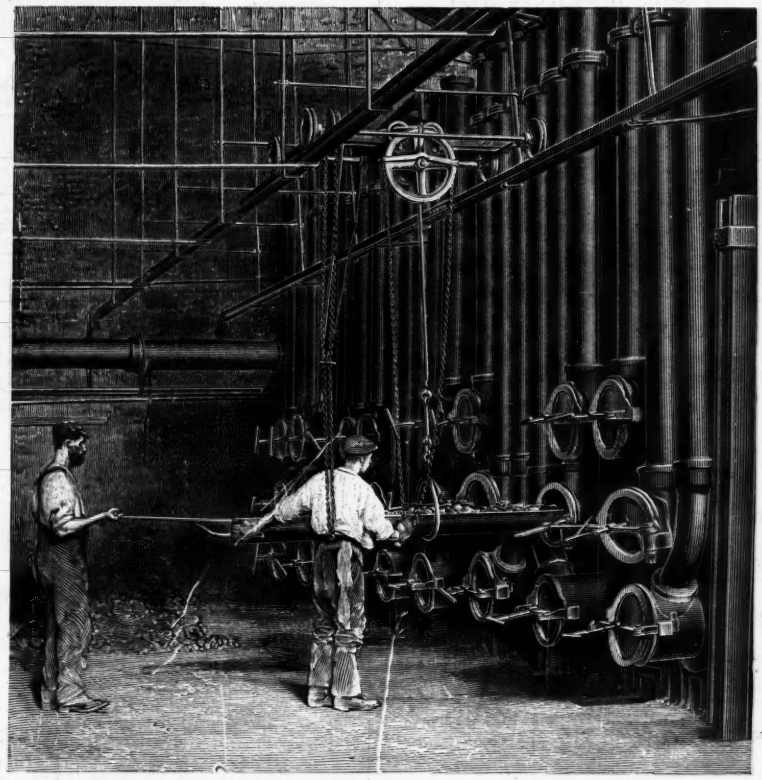

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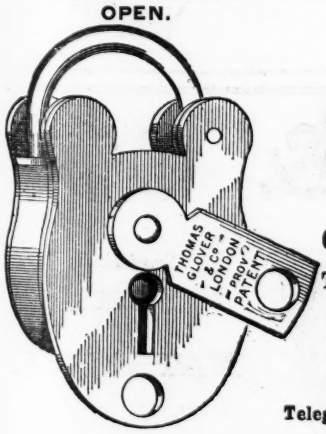

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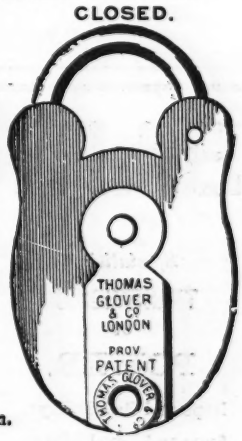

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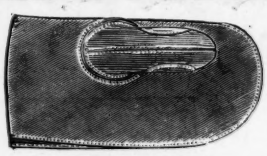

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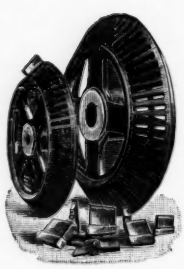

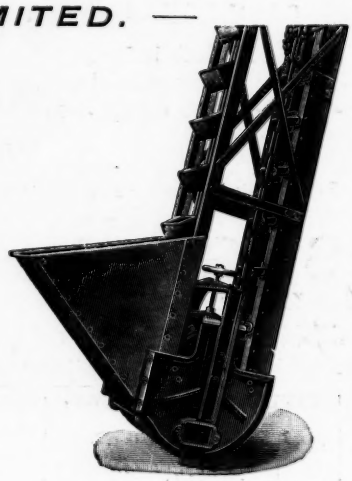

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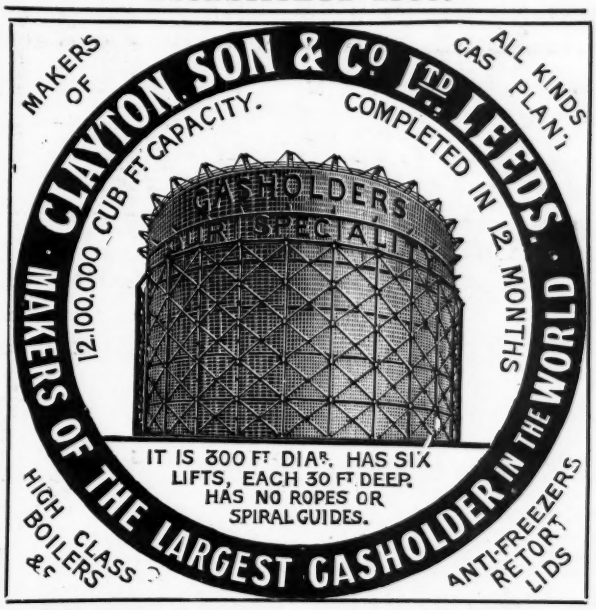
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